BENTON ELECTRIC, INC.
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GET CONNECTED

Jefferson Public Works
Shop Building 2011

701 N Second Street
City of Jefferson, Oregon

Electrical Equipment

Operation and Maintenance Manuals

Provided By: Benton Electric, Inc.
July, 2011 – January, 2012

Jefferson Public Works

Shop Building 2011

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16440

Panelboards

NF442L2C
PANELBOARD INTERIOR 250A MLO 42 CKT 3PH

PANEL 4

SQUARE D
by Schneider Electric

List Price $2,826.00 USD

Availability **Stock Item: This item is normally stocked in our distribution facility.**

PNL-4

Technical Characteristics

Shipping and Ordering

Category	08350 - Panelboards, Ready to Install, Accessories, Type NF
Discount Schedule	PE1A
GTIN	00785901871576
Package Quantity	1
Weight	40 lbs.
Availability Code	Stock Item: This item is normally stocked in our distribution facility.
Returnability	Y
Country of Origin	US

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N250MJ

PNLBD NF MB KIT USE W/J FRAME CB ONLY

SQUARE D
by Schneider Electric

List Price $780.00 USD

Availability **Stock Item: This item is normally stocked in our distribution facility.**

Technical Characteristics

Shipping and Ordering

Category	08351 - Panelboards, Ready to Install, Adapter Kits, Main Breaker, Type NF
Discount Schedule	PE1A
GTIN	00785901590996
Package Quantity	1
Weight	12 lbs.
Availability Code	Stock Item: This item is normally stocked in our distribution facility.
Returnability	Y
Country of Origin	US

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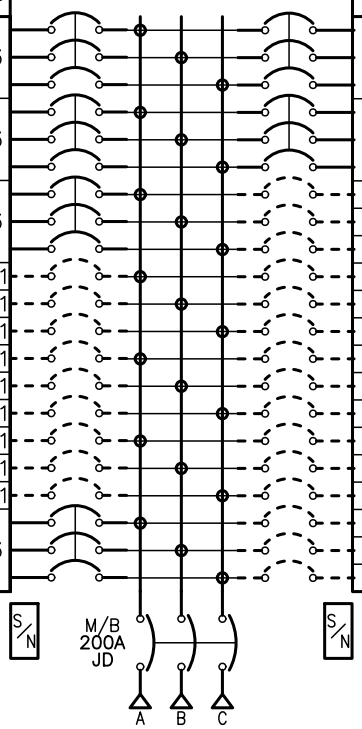
REV	DESCRIPTION	BY	DATE	–	----	--	--/--/--
–	----	--	--/--/--	–	----	--	--/--/--

CKT NO	ACCESSORIES	TYPE	RATING AMP/P
1		EDB	30/3
3			
5			
7		EDB	20/3
9			
11			
13		EDB	20/3
15			
17			
19	PREPARED SPACE	EDB	20/1
21	PREPARED SPACE	EDB	20/1
23	PREPARED SPACE	EDB	20/1
25	PREPARED SPACE	EDB	20/1
27	PREPARED SPACE	EDB	20/1
29	PREPARED SPACE	EDB	20/1
31	PREPARED SPACE	EDB	20/1
33	PREPARED SPACE	EDB	20/1
35	PREPARED SPACE	EDB	20/1
37		EDB	125/3
39			
41			



RATING AMP/P	TYPE	ACCESSORIES	CKT NO
20/3	EDB		2
			4
			6
20/3	EDB		8
			10
			12
20/1	EDB	PREPARED SPACE	14
20/1	EDB	PREPARED SPACE	16
20/1	EDB	PREPARED SPACE	18
20/1	EDB	PREPARED SPACE	20
20/1	EDB	PREPARED SPACE	22
20/1	EDB	PREPARED SPACE	24
20/1	EDB	PREPARED SPACE	26
20/1	EDB	PREPARED SPACE	28
20/1	EDB	PREPARED SPACE	30
20/1	EDB	PREPARED SPACE	32
20/1	EDB	PREPARED SPACE	34
20/1	EDB	PREPARED SPACE	36
20/1	EDB	PREPARED SPACE	38
20/1	EDB	PREPARED SPACE	40
20/1	EDB	PREPARED SPACE	42

PHYSICAL DATA

ENCLOSURE Type 1
Surface with Door
FRONT CAT#: NC56S
BOX CAT#: MH56
DIMENSIONS:
56''H x 20''W x 5.75''D
WIRE BENDING SPACE:
TOP – 5
BOTTOM – 12.75
SIDE – 4.1
PBA: 553
BUSSING: Copper
Silver/Tin Plated
OPTIONAL FEATURES:
Aluminum Solid Neutral
ALUMINUM GROUND BAR

ELECTRICAL DATA

SYSTEM: 480Y/277V 3Ph 4W 60Hz
System Ampacity: 200A
14kA SYMS. SCCR
MAIN: MAIN BREAKER JD 200A
ACC:
Bottom FEED
18kA AIR
INCOMING CONDUCTORS(S) PER NEC:
3/0 – 350 kcmil
BRANCH MOUNTING TYPE: BOLT–ON
----------BRANCH SUMMATION----------

1 – 30A/3P EDB	4 – 20A/3P EDB
24 – 20A/1P–PS EDB	1 – 125A/3P EDB

JOB NAME:	JEFFERSON PUBLIC WORKS	EQUIPMENT DESIGNATION:	PNL–4
JOB LOCATION:	JEFFERSON OR	EQUIPMENT TYPE:	NF (Circuit Breaker Type) PANEL 1 OF 1
DRAWN BY:	(Q2C)	DRAWING TYPE:	ONE LINE DIAGRAM
ENGR:			
DATE:	August 08 2011		
DRAWING STATUS:	QUOTE NOT FOR CONSTRUCTION	DWG#	030291375–01

Product Data Sheet

NQ442L2C

PNLBD INT NQ 225A MLO 42 CKT 3P CU

List Price $1,551.00 USD

Availability **Stock Item: This item is normally stocked in our distribution facility.**

PNL-5

PANEL 5

Technical Characteristics

Shipping and Ordering

Category	09151 -
Discount Schedule	PE1A
GTIN	00785901507871
Package Quantity	1
Weight	20.5 lbs.
Availability Code	Stock Item: This item is normally stocked in our distribution facility.
Returnability	Y
Country of Origin	US

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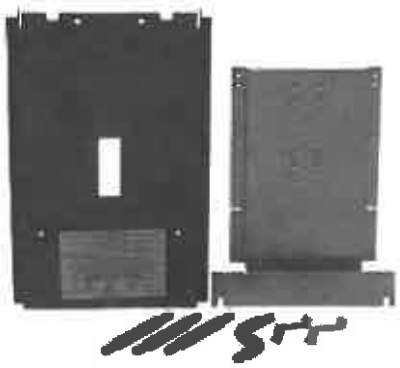
NQMB2Q
PNLBD NQ MCB KIT FOR 225A MAX Q FRAME



List Price $780.00 USD

Availability **Stock Item: This item is normally stocked in our distribution facility.**

Technical Characteristics

Shipping and Ordering

Category	09151 -
Discount Schedule	PE1A
GTIN	00785901666103
Package Quantity	1
Weight	9.11 lbs.
Availability Code	Stock Item: This item is normally stocked in our distribution facility.
Returnability	Y
Country of Origin	US

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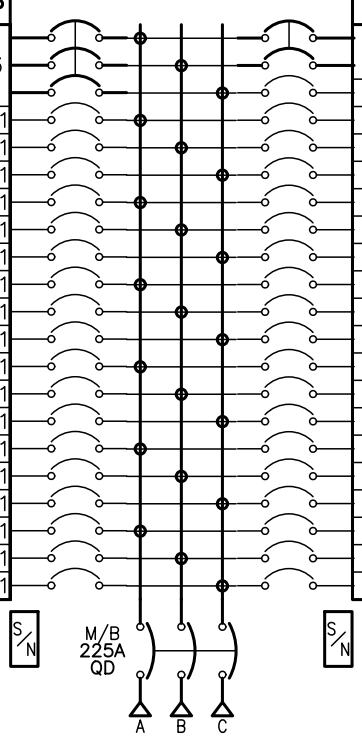
REV	DESCRIPTION	BY	DATE	–	----	--	--/--/--
–	----	--	--/--/--	–	----	--	--/--/--

CKT NO	ACCESSORIES	TYPE	RATING AMP/P
1		QOB–VH	40/3
3			
5			
7		QOB–VH	20/1
9		QOB–VH	20/1
11		QOB–VH	20/1
13		QOB–VH	20/1
15		QOB–VH	20/1
17		QOB–VH	20/1
19		QOB–VH	20/1
21		QOB–VH	20/1
23		QOB–VH	20/1
25		QOB–VH	20/1
27		QOB–VH	20/1
29		QOB–VH	20/1
31		QOB–VH	20/1
33		QOB–VH	20/1
35		QOB–VH	20/1
37		QOB–VH	20/1
39		QOB–VH	20/1
41		QOB–VH	20/1

RATING AMP/P	TYPE	ACCESSORIES	CKT NO
70/2	QOB–VH		2
			4
20/1	QOB–VH		6
20/1	QOB–VH		8
20/1	QOB–VH		10
20/1	QOB–VH		12
20/1	QOB–VH		14
20/1	QOB–VH		16
20/1	QOB–VH		18
20/1	QOB–VH		20
20/1	QOB–VH		22
20/1	QOB–VH		24
20/1	QOB–VH		26
20/1	QOB–VH		28
20/1	QOB–VH		30
20/1	QOB–VH		32
20/1	QOB–VH		34
20/1	QOB–VH		36
20/1	QOB–VH		38
20/1	QOB–VH		40
20/1	QOB–VH		42



PHYSICAL DATA

ENCLOSURE Type 1
Surface with Door
FRONT CAT#: NC50S
BOX CAT#: MH50
DIMENSIONS:
50''H x 20''W x 5.75''D
WIRE BENDING SPACE:
TOP – 5
BOTTOM – 9.26
SIDE – 6.13
PBA: 707A
BUSSING: Copper
Silver/Tin Plated
OPTIONAL FEATURES:
Aluminum Solid Neutral
ALUMINUM GROUND BAR

ELECTRICAL DATA

SYSTEM: 208Y/120V 3Ph 4W 60Hz
System Ampacity: 225A
14kA SYMS. SCCR
MAIN: MAIN BREAKER QD 225A
ACC:
Bottom FEED
25kA AIR
INCOMING CONDUCTORS(S) PER NEC:
#4 – 300 kcmil
BRANCH MOUNTING TYPE: BOLT–ON
----------BRANCH SUMMATION----------
1 – 40A/3P QOB–VH
1 – 70A/2P QOB–VH
37 – 20A/1P QOB–VH

JOB NAME:	JEFFERSON PUBLIC WORKS	EQUIPMENT DESIGNATION:	PNL–5
JOB LOCATION:	JEFFERSON OR	EQUIPMENT TYPE:	NQ (Circuit Breaker Type) PANEL 1 OF 1
DRAWN BY:	(Q2C)	DRAWING TYPE:	ONE LINE DIAGRAM
ENGR:			
DATE:	August 08 2011		
DRAWING STATUS:	QUOTE NOT FOR CONSTRUCTION	DWG# 030291375–01	PG 1 OF 1 REV –

NQ, NF, I-Line® and QMB Panelboard Products

Reliable,Versatile and Convenient Solutions

a brand of Schneider Electric

SQUARE D

Square D® Panelboard Family

Developed with customer input, Square D panelboards are built to last, featuring design innovations that make these products easy to install. Supported by the largest distribution, sales and service organization in the industry, Square D panelboards are readily available to meet the needs of contractors, consultants and end-users.

Application

	Commercial	Industrial	O.E.M.	Utility	Residential
NQ	• Schools/Universities • Public Buildings • Restaurants • Strip Malls • Hotels/Motels • Nursing Homes	• Hospitals • Factories • Chemical Plants • Water Treatment Plants	• Computer Power • HVAC • Panelboard Assemblers	• Equipment Rooms • Municipal Water/ Wastewater Facilities	• High-Rises • Apartments • Duplexes
NF	• High Bay Lighting • Shopping Malls • Office Buildings	• Automotive • Refineries • Textile Mills • Wastewater Treatment Plants	• Integrated Generator Enclosures • Panelboard Assemblers	• Equipment Rooms • Power Generation Facilities • Municipal Water/ Wastewater Facilities	—
I-Line	• Office Buildings • Strip Malls • Retail Stores • Grocery Stores • Nursing Homes	• Automotive • Paper Mills • Hospitals • Factories	• Panelboard Assemblers • HVAC	• Equipment Rooms • Power Generation Facilities	—
QMB	• Strip Malls • Retail Stores • Grocery Stores	• Automotive • Manufacturing Facilities • Refineries • Textiles	• Food Service Industry • Panelboard Assemblers	• Equipment Rooms • Power Generation Facilities	—

Product Table

Features	NQ	NF	Column-Width		I-Line	QMB
			NQ	NF		
AC Voltage (max)	240	600Y/347	240	600Y/347	600	600
DC Voltage (max)	48	—	—	—	250	250
Main Device Amps (max)	600	600	225	225	1200	800
Main Lugs Amps (max)	600	800	225	225	1200	1600
SCCR Amps x 1000 (max)	200	200	65	200	200	200
Plug-On/Bolt-On Branch	Both	Bolt	Bolt	Bolt	Plug	Plug
Top or Bottom Feed	Yes	Yes	Yes	Yes	Yes	Yes
UL and cUL Service Equipment	Yes	Yes	Yes	Yes	Yes	Yes
Enclosure Types	1, 3R, 4, 4X, 5, 12	1, 3R, 4, 4X, 5, 12	1	1	1, 3R, 4, 4X, 5, 12	1, 3R, 4, 4X, 5, 12

NQ and NF Lighting Panelboards

Designed with extensive customer input

The NF and NQ families of lighting panelboards have been redesigned to meet the evolving needs of our customers. Easier to install, improved availability and greater installation flexibility all combine to make these panels state of the art in lighting panelboards.

NF and NQ Panelboard Improvements

- 66, 72 and 84 circuit interiors that fit in a single enclosure that will be allowed by the 2008 National Electric Code® (NEC®)
- 50% fewer enclosures to reduce complexity and installation errors
- Common trims for NF and NQ to simplify inventory
- Simplified and more pictorial installation instructions to save installation time
- Broad range of new, field-installable, ready-to-install kits available from local distributor stock:
  - NQ: Thru-feed and sub-feed lugs
  - NQ: Sub-feed circuit breakers
  - NF and NQ: Transient Voltage Surge Suppression (TVSS) interiors
  - NF and NQ: 200% neutrals
  - NF and NQ: Copper neutrals and ground
- NF and NQ: 6", 12" and 18" rail and dead front extension
- Plastic filler plates in place of "twist-outs" to reduce branch circuit breaker installation time

Available Branch Circuit Count in a Single Enclosure

	18	30	42	54	*66	*72	*84
NQ	x	x	x	x		x	x
NF	x	x	x	x	x		x

***** *Available in U.S. locations that have adopted the 2008 National Electrical Code*

NQ Lighting Panelboards

PANEL 5

Developed with electrical contractor input, the NQ family of lighting and appliance panelboards sets new standards for ease of installation and durability. Plus, new design innovations increase the availablity of these panelboards by offering complete ready to install products.

Features

- 240Vac, 48Vdc maximum
- 600A maximum main circuit breakers or main lugs
- 150A maximum branch circuit breakers
- 10,000A through 200,000A SCCR
- Both fully rated and series rated systems are available
- Interiors are field convertible to top or bottom feed
- Interiors are available in plated copper or aluminum bus
- Interiors accept both bolt-on and plug-on branch circuit breakers
- Complete line of UL/cUL listed interiors with 200% rated neutrals for non-linear loads
- Suitable for use as service entrance equipment
- 20" wide trims and boxes common for NQ and NF panelboards
- Mono-flat® or hinged trims

Factory Options

- 1P3W or 3P4W – 600A main lugs and main breaker panelboards
- Sub-feed and thru-feed lugs
- Sub-feed circuit breakers
- Optional 200% rated neutrals up to 400A
- Split bus bars
- TVSS
  - 100,000A – 240,000A surge current rating
  - All voltage systems
- Lighting contactors
- Customer equipment space

"Ready-to-Install" Panels and Kits Available from Stock

- 100A – 600A MLO 1P3W and 3P4W Interiors
- NEMA 1 and 3R/12 enclosures
- 100A – 400A main circuit breaker kits
- TVSS interiors
  - 120,000A or 160,000A surge current ratings
- 100A – 400A sub-feed and thru-feed lugs
- Sub-feed circuit breaker kits
  - 1 – 225A sub-feed circuit breaker per 225A panelboard
  - 2 – 225A sub-feed circuit breakers per 400A panelboard
- 200% neutral kits up to 400A
- Copper neutrals and equipment ground bars

NF Lighting Panelboards

PANEL 4

The NF panelboard offers superior performance and application flexibility for commercial and industrial electrical systems up to 600Y/347Vac. This versatile lighting and power distribution panelboard features a wide selection of circuit breakers, accessories and ready-to-install kits, as well as 200% rated neutrals for non-linear loads.

Factory Options

- 1P3W or 3P4W – 800A main lugs and 600A main breaker panelboards
- Sub-feed and thru-feed lugs
- Sub-feed circuit breakers
- Optional 200% rated neutrals through 600A
- Split bus bars
- TVSS
  - 100,000A – 240,000A surge current rating
  - All voltage systems
- Lighting contactors
- Customer equipment space

Features

- 600Y/347Vac maximum
- 600A maximum main circuit breaker, 800A maximum main lugs
- 14,000A through 200,000A SCCR
- Sub-feed circuit breakers are vertically mounted
- 125A maximum branch mounted circuit breakers (110A for 600Y/347V)
- Interiors are field convertible to top or bottom feed
- Bolt-on branch circuit breakers attach with captive screws
- Visi-Trip® indication on branch circuit breakers
- Suitable for use as service equipment
- Complete line of UL/cUL listed interiors with 200% rated neutrals for non-linear loads
- 20" wide trims and boxes common for NF and NQ panelboards
- Mono-flat or hinged trims
- Vertically mounted main breakers available, all amperages
- Branch circuit filler plates provide fast and easy installation

"Ready-to-Install" Panels and Kits Available from Stock

- 100A – 600A MLO 3P4W interiors
- Type 1 and 3R/12 enclosures
- 100A – 400A main circuit breaker kits
- 120,000A or 160,000A surge current ratings
- 100A – 400A sub-feed and thru-feed lugs
- Sub-feed circuit breaker kits
  - 1 – 250A sub-feed circuit breaker per 250A panelboard
  - 2 – 250A sub-feed circuit breakers per 400A or 600A panelboard
- 200% neutral kits up to 400A
- Copper neutrals and equipment ground bars

Features	Panelboard Types					Benefits
	NQ	NF	Column-Width	I-Line	QMB	
Complete ready-to-install product offering	Yes	Yes	Yes	Yes	Yes	Products available from local distributor stock
Main circuit breaker ready-to-install kits	Yes	Yes	–	–	–	Creates flexible inventory
Vertically mounted main breakers available	Yes	Yes	Yes	Yes	–	Allows quick main breaker identification as a result of vertical handle motion
Field installable cULus listed 200% neutral for non-linear loads	Yes	Yes	–	Yes	–	Field installable 200% neutral now available
Plug-on and bolt-on branches	Both	Bolt-on	Bolt-on	Plug-on	–	Allows flexibility in breaker selection which eliminates duplicate stock
Branch breakers equipped with captive hardware	Yes	Yes	Yes	Yes	Yes	Saves time, keeps screws from getting lost
Ready-to-install hinged trim option	Yes	Yes	–	Yes	–	Provides economical alternative to door-in-door construction
Simple enclosure mounting	Yes	Yes	Yes	Yes	Yes	Reduces installation time and eliminates hardware required
Field convertible from bottom to top feed	Yes	Yes	Yes	Yes	Yes	Allows flexibility for installation
Plated bus as standard	Yes	Yes	Yes	Yes	Yes	Provides for superior bus to breaker electrical connection
Galvanized box	Yes	Yes	Yes	Yes	Yes	Provides superior corrosion resistance
Direct connection between branch device and bus	Yes	Yes	Yes	Yes	Yes	Eliminates additional connections, saving installation time
Push-to-trip feature	–	–	–	Yes	–	Provides convenient means to periodically test the breaker
Visi-Trip® indication	Yes	Yes	Yes	–	–	Provides positive indication of a tripped breaker
Split neutral	Yes	Yes	–	–	–	Allows uniform branch wire termination, reducing waste
Dual cover interlocks	–	–	–	–	Yes	Prevents opening of cover when switch is ON or turning switch to ON while cover is open. Interlocks may be manually overridden
True blade and jaw construction	–	–	–	–	Yes	Provides a firm electrical connection
Dual colored operating handles	–	–	–	–	Yes	Allows for quick visual inspection of switch handle for ON or OFF indication (red and black handle)

Federal Specifications	Descriptions
W-C-375B/GEN	Molded Case Circuit Breakers
W-C-865C	Fusible Switches
W-P-115B Type I Class I	Circuit Breaker Panelboards
W-P-115B Type II Class I	Fusible Switch Panelboards

Codes	Descriptions
NEC Article 384	Panelboards
NFPA 70	National Electrical Code (NEC)
2003 IBC, NFPA 5000, ASCE/SE17	Seismic Qualification

Standards	Descriptions
UL 50	Enclosures for Electrical Equipment
UL 67	Panelboards
UL 98	Enclosed and Deadfront Switches
UL 489	Molded Case Circuit Breakers
NEMA AB 1	Molded Case Circuit Breakers and Molded Case Switches
NEMA KS 1	Enclosed Switches
NEMA PB 1	Panelboards
NEMA 250	Enclosures for Electrical Equipment
C22.2 No.4	Enclosed Switches
C22.2 No.5	Moulded Case Circuit Breakers
C22.2 No.29	Panelboards and Enclosed Panelboards
C22.2 No.94	Special Purpose Enclosures

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NF/NFOM Panelboards
Information Manual
Class 1670

Instruction Bulletin

80043-741-02

Retain in the directory card pocket for future use.

PANEL 4

by Schneider Electric

HAZARD CATEGORIES AND SPECIAL SYMBOLS

Read these instructions carefully and look at the equipment to become familiar with the device before trying to install, operate, service, or maintain it. The following special messages may appear throughout this bulletin or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.

The addition of either symbol to a “Danger” or “Warning” safety label indicates that an electrical hazard exists which will result in personal injury if the instructions are not followed.

This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

⚠ DANGER

DANGER indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

⚠ WARNING

WARNING indicates a potentially hazardous situation which, if not avoided, can result in death or serious injury.

⚠ CAUTION

CAUTION indicates a potentially hazardous situation which, if not avoided, can result in minor or moderate injury.

CAUTION

CAUTION, used without the safety alert symbol, indicates a potentially hazardous situation which, if not avoided, can result in property damage.

Provides additional information to clarify or simplify a procedure.

PLEASE NOTE Electrical equipment should be installed, operated, serviced, and maintained only by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material.

ENGLISH

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ENGLISH

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ENGLISH

Introduction

This bulletin contains instructions for installing Square D® brand NF and NFOM circuit breaker panelboards. These panelboards are Underwriters Laboratories (cULus) listed and accept ECB, EDB, EGB, and EJB branch circuit breakers.

For technical support on the installation of this panelboard, contact the Square D/Schneider Electric Customer Information Center at 1-888-SquareD (1-888-778-2733).

See the labels on the equipment for rating and safety information. Additional equipment labels are provided with this document.

Safety Precautions

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Read and understand this entire instruction bulletin and the included NEMA PB 1.1 standards publication before installing, operating, or maintaining this equipment.
- Local codes vary, but are adopted and enforced to promote safe electrical installations. A permit may be needed to do electrical work, and some codes may require an inspection of the electrical work.
- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E.
- This equipment must only be installed and serviced by qualified electrical personnel.
- Turn off all power supplying this equipment before working on or inside the equipment.
- Always use a properly-rated voltage sensing device to confirm all power is off.
- Replace all devices, doors and covers before turning on power to this equipment.

Failure to follow these instructions will result in death or serious injury.

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Installation

This section provides instructions for the following NF/NFOM panelboard procedures:

- "Interior Mounting for Square D Brand Enclosures" on page 8
- "Neutral Bonding Strap Installation" on page 11
- "ECB, EDB, EGB, and EJB Circuit Breaker Installation and Removal" on page 15
- "Circuit Breaker Reset Instructions" on page 17
- "Interior Trim Preparation" on page 18

Interior Mounting for Square D Brand Enclosures

A separate standards publication, titled "General Instructions for Proper Installation, Operation, and Maintenance of Panelboards Rated 600 Volts or Less" (NEMA PB1.1), has been provided with this equipment. Familiarize yourself with the content of this document before proceeding with any of the following procedures.

If you did not receive a copy of this document, or if you have any questions regarding this equipment, contact your local distributor or Schneider Electric representative.

CAUTION

HAZARD OF EQUIPMENT DAMAGE

- Ensure all connections are properly tightened.
- Refer to the torque information label provided on the panelboard before tightening the connections.

Failure to follow these instructions can result in equipment damage.

To properly mount and install the NF/NFOM panelboard interior, please refer to the NEMA PB 1.1 standards publication, and follow the instructions below for either "Surface Mounting (Enclosure Mounted on Wall)" or "Flush Mounting (Enclosure Recessed in Wall)."

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Surface Mounting (Enclosure Mounted on Wall)

1. Mount the enclosure as instructed in the NEMA PB 1.1 standards publication.
2. Remove the interior trim from the trim brackets.
3. Install the interior as described below:
   a. Thread the provided elevating nuts on the enclosure studs.
   b. Set the interior on the enclosure studs. (See Figure 1 on page 10).
   c. Tighten the flange nuts against the interior side rails until the rails are against the back of the enclosure.
   d. Remount the interior trim after wiring.
4. If used as service entrance equipment, neutral bonding is required. See the “Neutral Bonding Strap Installation” instructions on page 11.
5. Apply equipment labels (located in the bag assembly) as directed by the instructions on the back of the equipment label sheet.

Flush Mounting (Enclosure Recessed in Wall)

1. Mount the enclosure as instructed in the NEMA PB 1.1 standards publication.
2. Remove the interior trim from the trim brackets.
3. Install the interior as described below:
   a. Thread the provided elevating nuts on the enclosure studs.
   b. Set the interior on the enclosure studs (see Figure 1 on page 10). Place the flange nuts onto the enclosure studs, but do not tighten.
   c. Adjust the elevating nuts so that the lip of the interior trim is approximately 0.25 inches (6.35 mm) from wall line.
   d. Tighten the flange nuts against the side rails.
   e. Remount the interior trim after wiring.
4. If used as service entrance equipment, neutral bonding is required. See the “Neutral Bonding Strap Installation” instructions on page 11.
5. Apply equipment labels (located in the bag assembly) as directed by the instructions on the back of the equipment label sheet.

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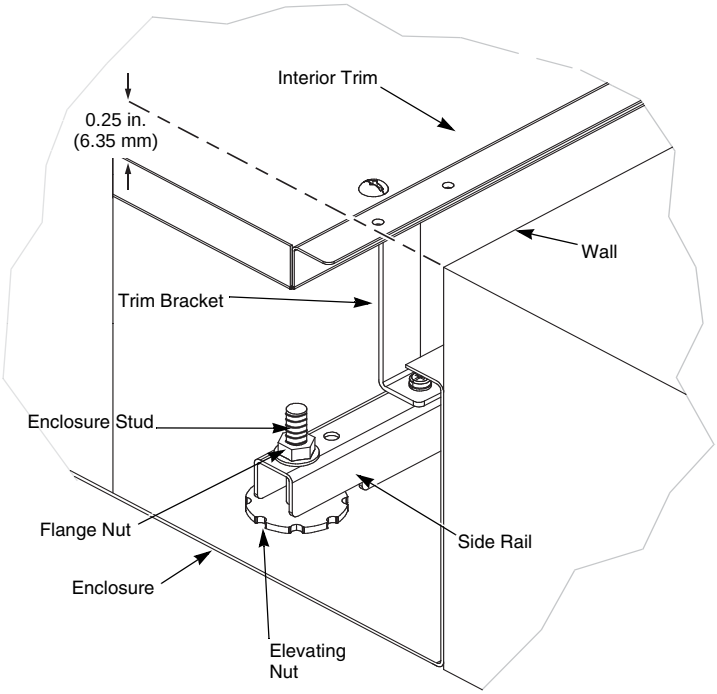
Figure 1: Interior Mounting of Square D Brand Enclosures



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Neutral Bonding Strap Installation

The neutral bonding strap should be used only when the panelboard is **installed** as service equipment.

To properly bond the neutral to the panelboard, follow the instructions for either “125 A or 250 A Maximum NF Panelboards”, “400 A or 600 A Maximum NF Panelboards”, or “800 A Maximum NF Panelboards” below, and on pages 12–14.

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Turn off all power supplying this equipment before working on or inside the equipment.
- The main bonding strap should be used only when the panelboard is installed as service equipment.
- Do not mix the mounting screws with the interior trim screws.

Failure to follow these instructions will result in death or serious injury.

NOTE: The bonding strap parts are found in the bag assembly provided with the interior.

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125 A or 250 A Maximum NF Panelboards

To install a neutral bonding strap on a 125 A or 250 A maximum NF panelboard, refer to Figure 2 and follow the instructions below.

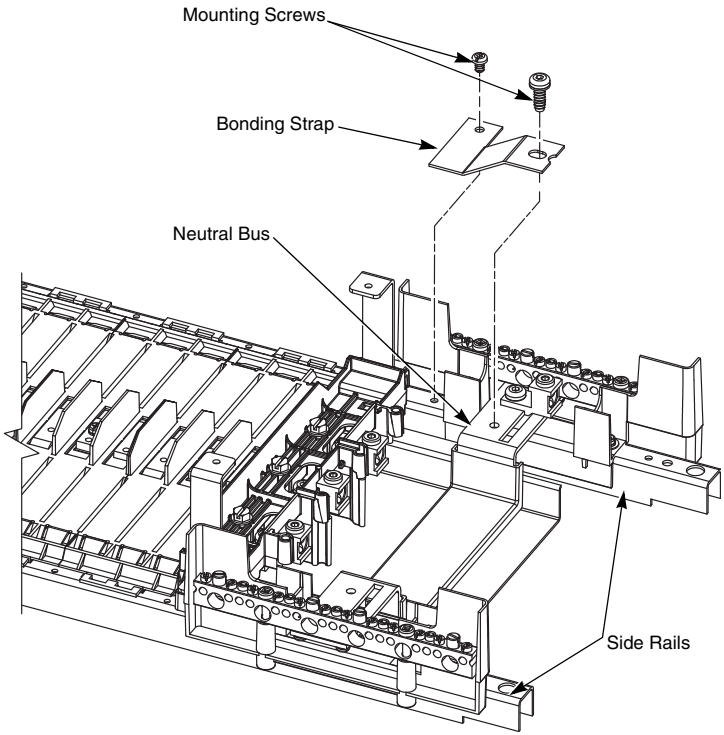
1. Align the bonding strap on the side rail, as pictured.

   NOTE: For some applications, it may be necessary to remove the lug (not pictured) before installing the bonding strap.

2. Insert the two mounting screws, as pictured. Tighten the 10-32 screw to 10–12 lb-in (1.1–1.4 N•m) and the 1/4-20 screw to 25–30 lb-in (2.8–3.4 N•m).

   NOTE: If the lug was removed in Step 1, reinstall it on top of the bonding strap. Use the 1/4-20 x 3/4 in. mounting screw. Lug mounting screws are provided in the bonding strap bag assembly.

Figure 2: Bonding Strap Installation — 125 A or 250 A Maximum NF Panelboards



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400 A or 600 A Maximum NF Panelboards

To install a neutral bonding strap on a 400 A or 600 A maximum NF panelboard, refer to Figure 3 and follow the instructions below.

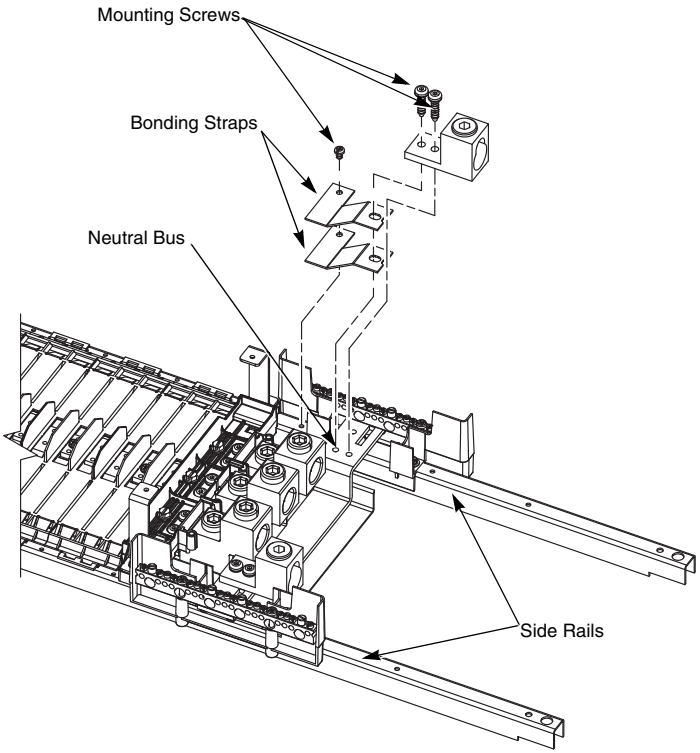
1. Align the two bonding straps on the side rail, as pictured.

   NOTE: For some applications, it may be necessary to remove the lug before installing the bonding strap.

2. Insert the three mounting screws, as pictured. Tighten the 10-32 screw to 10–12 lb-in (1.1–1.4 N•m) and the two 1/4-20 screws to 60–65 lb-in (6.8–7.3 N•m).

   NOTE: If the lug was removed in Step 1 above, reinstall it on top of the bonding strap. Use the 1/4-20 x 1 1/8 in. mounting screws. Lug mounting screws are provided in the bonding strap bag assembly.

Figure 3: Bonding Strap Installation — 400 A or 600 A Maximum NF Panelboards



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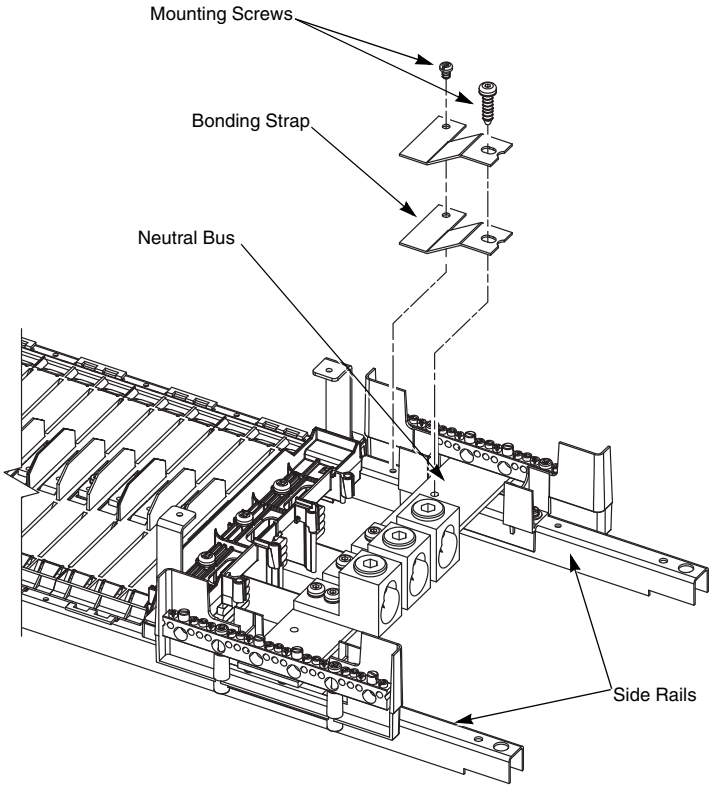
800 A Maximum NF Panelboards

To install a neutral bonding strap on an 800 A maximum NF panelboard, refer to Figure 4 and follow the instructions below.

1. Align the two bonding straps on the side rail, as pictured.
2. Insert the two mounting screws, as pictured. Tighten the 10-32 screw to 10–12 lb-in (1.1–1.4 N•m) and the 1/4-20 screw to 60–65 lb-in (6.8–7.3 N•m).

Figure 4: Bonding Strap Installation — 800 A Maximum NF Panelboards



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ECB, EDB, EGB, and EJB Circuit Breaker Installation and Removal

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E.
- This equipment must only be installed and serviced by qualified electrical personnel.
- Turn off all power supplying this equipment before working on or inside equipment.
- Always use a properly-rated voltage sensing device to confirm that all power is off.
- All unused spaces must be filled with blank fillers.
- Replace all devices, doors and covers before turning on power to this equipment.

Failure to follow these instructions will result in death or serious injury.

ECB, EDB, EGB, and EJB Circuit Breaker Installation

Refer to Figure 5 on page 16 for the following instructions:

1. Turn off all power to the panelboard.
2. Turn the breaker off.
3. Remove the interior trim.
4. With the bolt-on connector end of the circuit breaker slightly elevated, insert the mounting foot into the slot in the phase cover.
5. Rotate the breaker down and back until the captive screw(s) align with the tapped holes in the breaker connectors.
6. Engage the screws into the branch connector hole and tighten it to 20–30 lb-in (2.3–3.4 N•m).
7. Install the load wire.
8. Reinstall the interior trim.

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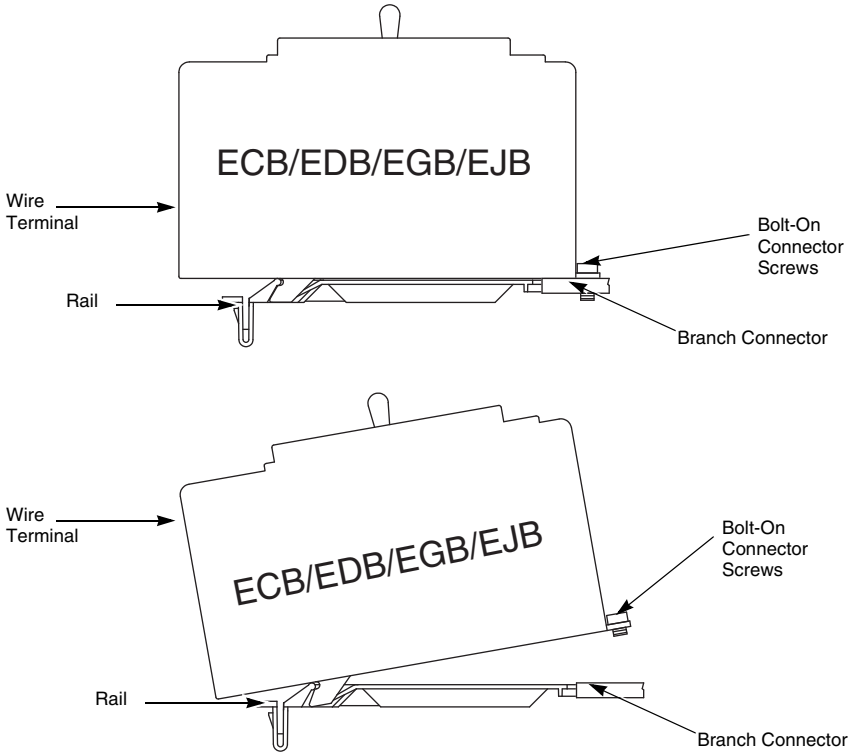
ECB, EDB, EGB, and EJB Circuit Breaker Removal

Refer to Figure 5 on page 16 for the following instructions:

1. Turn off all power to the panelboard.
2. Remove the interior trim.
3. Turn the breaker off.
4. Remove the load wire.
5. Loosen the screw(s) in the breaker connector and lift the breaker off of the panelboard.
6. Reinstall the interior trim.

Figure 5: ECB, EDB, EGB, and EJB Circuit Breaker Installation and Removal



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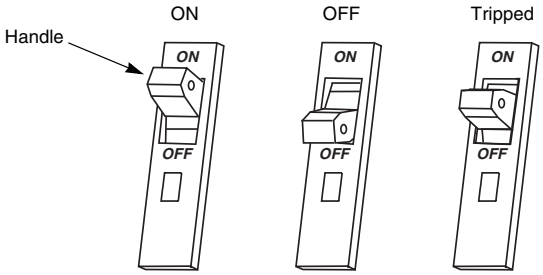
Circuit Breaker Reset Instructions

If the circuit breaker is tripped, the handle will be at the mid-position between ON and OFF. To reset the circuit breaker, push the handle to the OFF position, then to the ON position.

Figure 6: Circuit Breaker Handle Positions



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Interior Trim Preparation

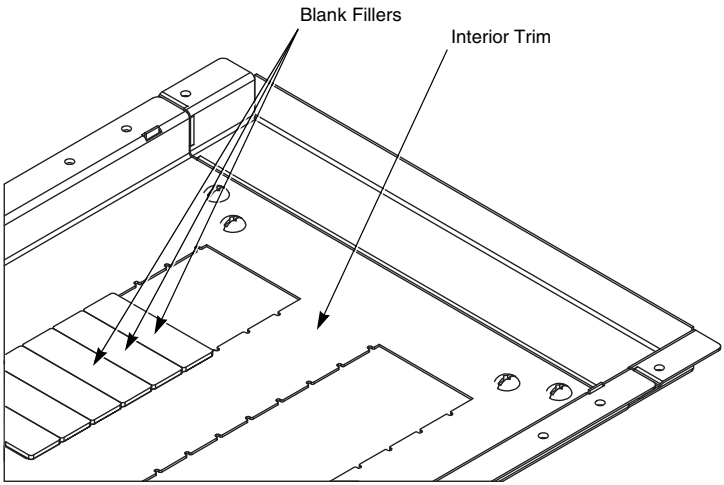
⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Before energizing the panelboard, all unused spaces must be filled with blank fillers.
- Replace all devices, doors, and covers before energizing this equipment.

Failure to follow this instruction will result in death or serious injury.

Figure 7: Interior Trim Diagram



NOTE: The back of the interior trim lists the catalog number for its corresponding compatible blank fillers.

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Appendix 1: Specifications

Typical Wiring

NOTE: Do not use on 600 V or 480 V, 3-phase 3-wire delta systems.

Table 1: Panelboard Typical Wiring[1]

	1-Phase Panelboards		3-Phase Panelboards	
Voltage AC	**Phase**	**Wires**	**Phase**	**Wires**
600Y/347	1	3	3	4
480Y/277	1	3	3	4
208Y/120	1	3	3	4
120/240	1	3	—	—
240[2]	1	2	3	3
240	3	3	—	—
240/120[3]	—	—	3	4 Delta

1 Additional information is provided on the panelboard. See the main circuit breaker rating, if used.

2 For this system, the neutral is not used.

3 When wiring for a delta system, phases “A” and “C” must be 120 V to neutral, phase “B” 208 V to neutral.

Integral Main or Sub-Feed
(FI, KI, H, J, LA, LC, LH, EDB, EGB, EJB)

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Figure 8: NF/NFOM 125–250 A Main Lugs or Main Breaker Diagram

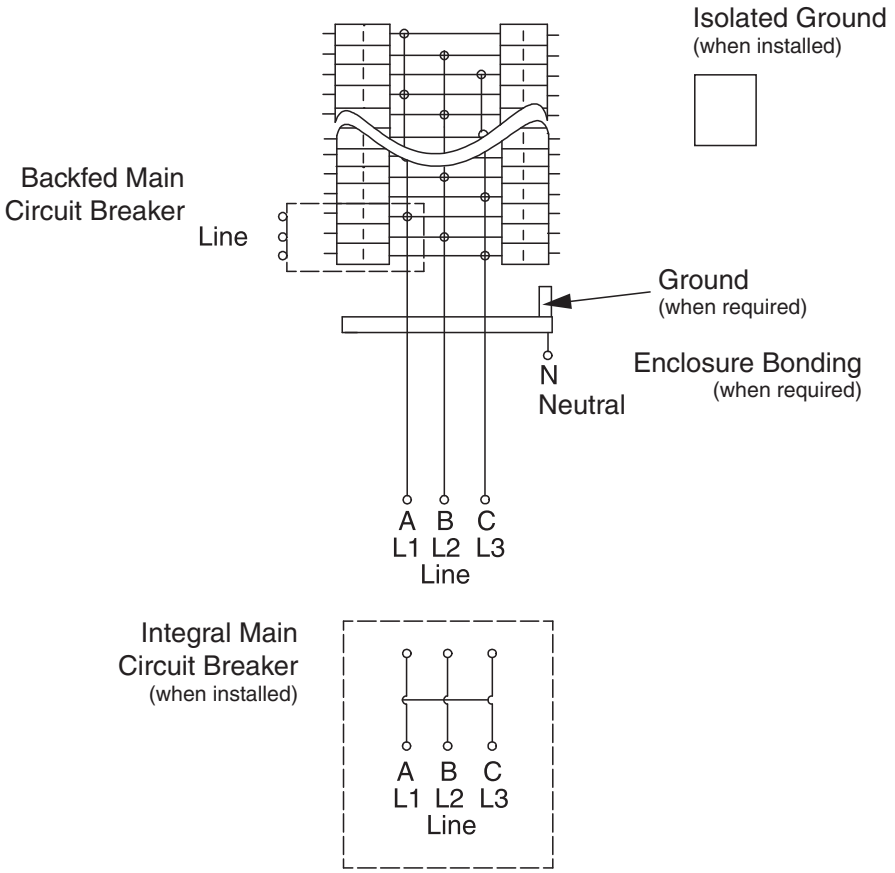

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Figure 9: NF 400–800 A Main Lugs or Main Circuit Breaker with or without Feed-Through Lugs Diagram

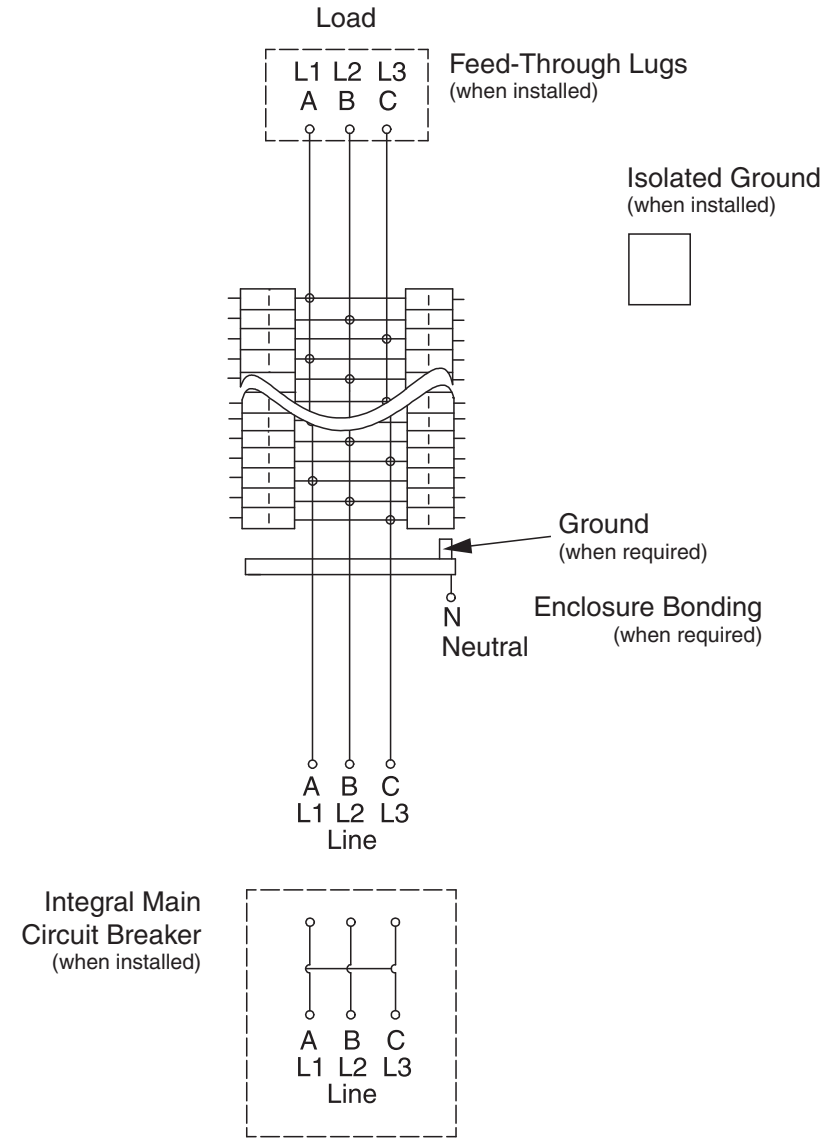

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Figure 10: NF 400–800 A Main Circuit Breaker with Feed-Through Lugs or Sub-Feed Circuit Breakers Diagram

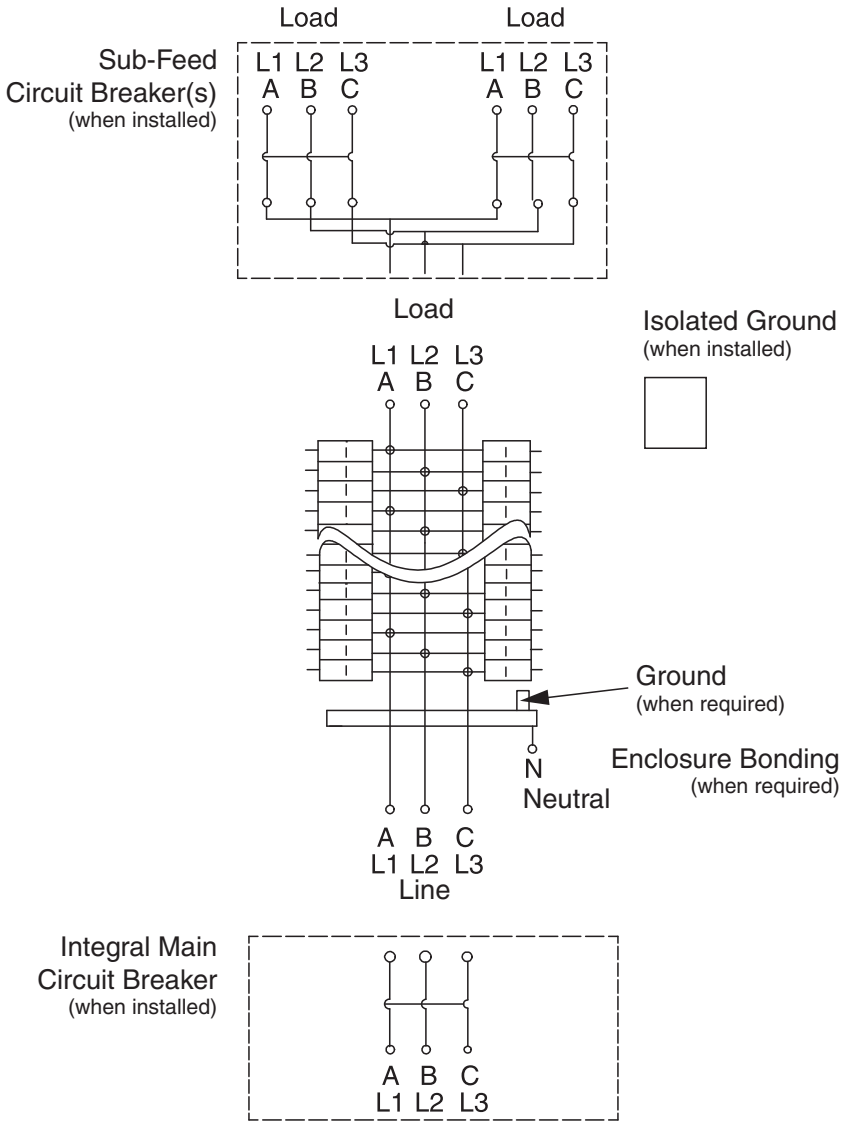

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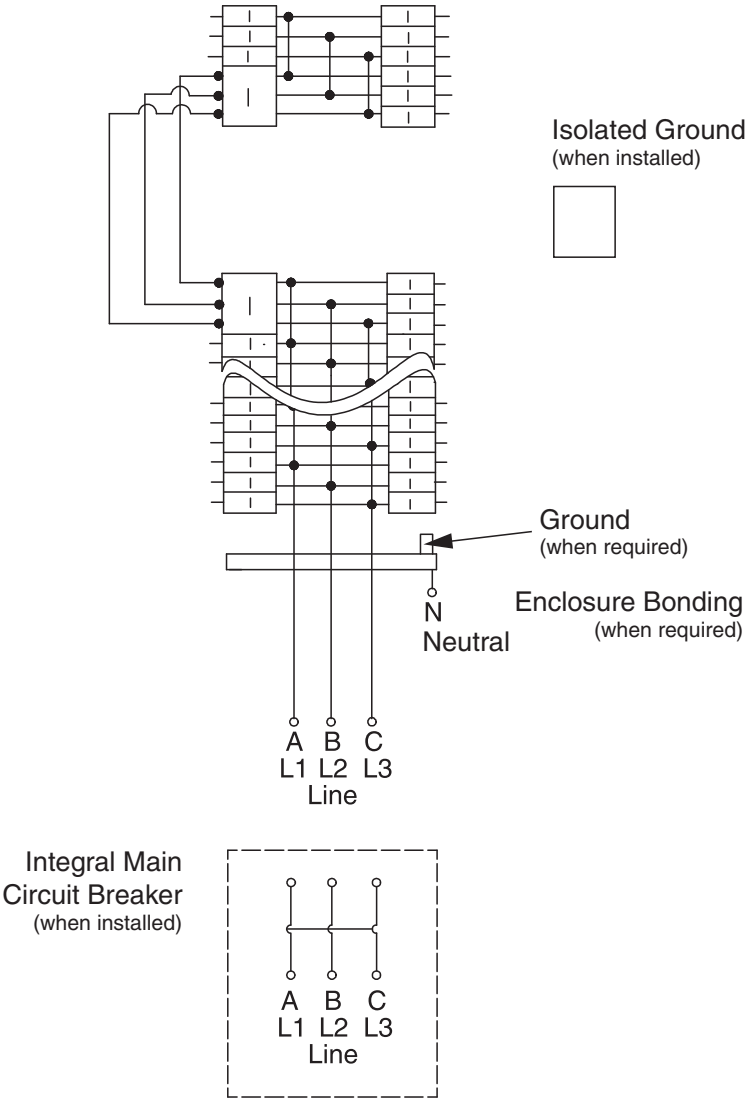
Figure 11: Typical NF Panelboard with Split Bus Diagram



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Panelboard Ratings

Refer to NEC section 110-22 and CEC rule 14-014 for more information. The series rated system label is located in the bag assembly.

NOTE: 125 A ED/EG/EJ breakers are 480Y/277 Vac maximum only.

Table 2: Series Connected Breaker Ratings (RMS Symmetrical)

Max. System Voltage AC[1]	Max. Short Circuit Current Rating	Square D Brand Integral or Remote Main Circuit Breakers and Remote Main Fuses	Square D Brand Branch Circuit Breaker Catalog Designation and Allowable Ampere Ranges
120 120/240 240	65,000	EG, FH, FG, KH, LH, MH, MX, HG, JG, DG	EDB, EDB–EPD
		EG	ECB–G3
	100,000	EJ, FC, FJ, KC, LC, LX, HJ, JJ	EDB, EDB–EPD, EGB
		DJ	EDB, EGB
		EJ, FC, KC, HJ, JJ	ECB–G3
	125,000	HL, JL	EDB, EDB–EPD, EGB, ECB–G3
	200,000	FI, KI, LI, LXI	EDB, EDB–EPD, EGB, EJB
		FI, KI	ECB–G3
		Class J or T (600 V) 200 A Max Fuses	ECB–G3
277 480Y/277	35,000	EG. FG, KH, LH, HG, JG, DG	EDB, EDB–EPD
		EG, HG, JG	ECB–G3
	65,000	EJ, FC, FJ, KC, LC, LX, HJ, JJ, DJ	EDB, EDB–EPD, EGB
		EJ, FC, KC, HJ, JJ	ECB–G3
	100,000	HL, JL	EDB, EDB–EPD, EGB, EJB
		DL	EDB, EGB, EJB
		400 A Max Fuses	EDB, EDB–EPD, EGB, EJB
	200,000	FI, KI, LI, LXI	EDB, EDB–EPD, EGB, EJB
		FI, KI	ECB–G3
		200 A Max Fuses	EDB, EDB–EPD, EGB, EJB, ECB–G3
600Y/347	18,000	HG, JG, MG	EDB
	25,000	EJ, FI, KH, KI, LC, LE, LX, LI, LXI, HJ, JJ	EDB, EGB
		LH	(15–70 A) EDB, EGB
	35,000	LC, LE, LX	EDB, EGB, EJB
	50,000	HL, JL	EDB, EGB, EJB
	65,000	FI, KI	EDB, EGB, EJB
		LI, LXI	EJB
	200,000	Class J or T (600 V) 200 A Max Fuses	EDB, EGB, EJB

[1] Short circuit tests are conducted at 100–105% of the maximum rated voltage of the panelboard.

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Short Circuit Current Rating for Main Lug Interiors with Sub-Feed or Feed-Through Lugs

Main lug interiors equipped with sub-feed or feed-through lugs, where the device feeding the interior is unknown or not a Square D device, are rated to 25,000 RMS symmetrical amperes at 600Y/347 Vac maximum for three cycles. Use of one of the Square D circuit breakers of the correct ampere rating, listed as main circuit breakers on page 19, ahead of these lugs will result in a rating equal to that of the circuit breaker.

CAUTION

HAZARD OF EQUIPMENT DAMAGE

Use only one wire per phase for incoming circuit breaker connections when the integral LH main circuit breaker is upstream of the feed-through lugs.

Failure to follow these instructions can result in equipment damage.

CE Marking

Interiors with the “CE” mark meet the IEC 60439-1 standard.

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Appendix 2: Accessory Kits

An assortment of field-installable accessory kits are available for NF panelboards:

- Equipment Ground Bar Kits, on page 27
- Sub-Feed Lug Kits 125–400 A Panelboards, on page 27
- Main Lug Kits
  - — Mechanical Lug Kits — Aluminum, on page 28
  - — Mechanical Lug Kits — Copper, on page 28
  - — Versa-Crimp® Compression Lug Kits — Aluminum, on page 29
  - — Versa-Crimp® Compression Lug Kits — Copper, on page 29

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Equipment Ground Bar Kits

Equipment ground bar kits, suitable for copper or aluminum wire, meet the grounding needs of NF panelboards.

Table 3: Equipment Ground Bar Kits Specifications

Panelboard		Use Ground Bar Kit Catalog Number	
Branch Circuit	**Mains Rating**	**Aluminum[1]**	**Copper[2]**
1–42	800 A Maximum	(1) PK27GTA	(1) PK27GTACU
54–84		(2) PK27GTA	(2) PK27GTACU

1 Aluminum bars suitable for 60° C or 75° C Copper or Aluminum conductors.

2 Copper bars suitable for 60° C or 75° C Copper conductors.

Ground bar mounting locations are identified by the ground symbol ⏚ stamped into the backwall of the enclosure.

Sub-Feed Lug Kits 125–400 A Panelboards

Sub-Feed main lugs are available for 125, 250, or 400 A applications.

Table 4: Sub-Feed Lugs kits for 125–400 A Panelboard Applications

Main Amps	Kit Catalog Number	Maximum Circuits
125	NF125SFL	18, 30
250	NF250SFL	30, 42, 54, 66, 84
400	NF400SFL	30, 42, 54, 66, 84

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Main Lug Kits

Table 5: Mechanical Lug Kits — Aluminum

Panelboard Amps	Kit Catalog Number	Wire Range
125	Standard	#6–350 kcmil 13.3–177.3 mm^2
250	Standard	
400	Standard	(1) 1/0–750 kcmil (2) 1/0–350 kcmil (1) 53.48–380 mm^2 (2) 53.48–177.3 mm^2
600	Standard	(2) 1/0–750 kcmil (2) 53.48–380 mm^2
800	Standard	(3) 1/0–750 kcmil (3) 53.48–380 mm^2

Table 6: Mechanical Lug Kits — Copper

Panelboard Amps	Kit Catalog Number	Wire Range
125	NFCUM1	#6–350 kcmil 13.3–177.3 mm^2
250	NFCUM2	
400	NFCUM4	(1) 1/0–750 kcmil (2) 1/0–350 kcmil (1) 53.48–380 mm^2 (2) 53.48–177.3 mm^2
600	NFCUM6	(2) 1/0–750 kcmil (2) 53.48–380 mm^2

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Table 7: Versa-Crimp® Compression Lug Kits — Aluminum

Panelboard Amps	Kit Catalog Number	Wire Range	Crimp Tool
125	NFALV1	#4–300 kcmil 21.15–152 mm^2	VC6
250	NFALV2	250–350 kcmil 126.7–177.3 mm^2	
400	NFALV4	(2) 2/0–500 kcmil (2) 67.43–253.4 mm^2	
600	NFALV6		

Table 8: Versa-Crimp® Compression Lug Kits — Copper

Panelboard Amps	Kit Catalog Number	Wire Range	Crimp Tool
125	NFCUV1	#6–1/0 kcmil 13.30–53.48 mm^2	VC6-3
250	NFCUV2	(1) 2/0–300 kcmil (1) 67.43–152 mm^2	VC6-FT, VC7, VC7-FT, VC8
400	NFCUV4	(1) 400–750 kcmil (1) 202.7–380 mm^2	
600	NFCUV6	(2) 250–500 kcmil (2) 126.7–253.4 mm^2	VC6 Series

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Electrical equipment should be installed, operated, serviced, and maintained only by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material.

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07/2010

NQ/NQM Panelboards and QONQ Load Centers

Information Manual
Class 1640

Instruction Bulletin

80043-712-05

Retain in the directory card pocket for future use.

PANEL 5

SQUARE D

by Schneider Electric

HAZARD CATEGORIES AND SPECIAL SYMBOLS

Read these instructions carefully and look at the equipment to become familiar with the device before trying to install, operate, service, or maintain it. The following special messages may appear throughout this bulletin or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.

The addition of either symbol to a “Danger” or “Warning” safety label indicates that an electrical hazard exists which will result in personal injury if the instructions are not followed.

This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

⚠ DANGER

DANGER indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

⚠ WARNING

WARNING indicates a potentially hazardous situation which, if not avoided, can result in death or serious injury.

⚠ CAUTION

CAUTION indicates a potentially hazardous situation which, if not avoided, can result in minor or moderate injury.

CAUTION

CAUTION, used without the safety alert symbol, indicates a potentially hazardous situation which, if not avoided, can result in property damage.

Provides additional information to clarify or simplify a procedure.

PLEASE NOTE Electrical equipment should be installed, operated, serviced, and maintained only by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material.

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Introduction

This bulletin contains instructions for installing Square D® brand NQ circuit breaker panelboards and QONQ load centers. These panelboards and load centers are Underwriters Laboratories (cULus) listed and accept QO® and QOB branch circuit breakers.

For technical support on the installation of this panelboard, contact the Square D/Schneider Electric Customer Information Center at 1-888-SquareD (1-888-778-2733).

See the labels on the equipment for rating and safety information. Additional equipment labels are provided with this document.

Safety Precautions

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Read and understand this entire instruction bulletin and the included NEMA PB 1.1 standards publication before installing, operating, or maintaining this equipment.
- Local codes vary, but are adopted and enforced to promote safe electrical installations. A permit may be needed to do electrical work, and some codes may require an inspection of the electrical work.
- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E.
- This equipment must only be installed and serviced by qualified electrical personnel.
- Turn OFF all power supplying this equipment before working on or inside the equipment.
- Always use a properly-rated voltage sensing device to confirm all power is OFF.
- Replace all devices, doors and covers before turning ON power to this equipment.

Failure to follow these instructions will result in death or serious injury.

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Installation

This section provides instructions for the following NQ panelboard and QONQ load center procedures:

- "Interior Mounting for Square D Brand Enclosures" on page 6
- "Neutral Bonding Strap/Cable Installation" on page 9
- "QO and QOB Circuit Breaker Installation and Removal" on page 12
- "Circuit Breaker Reset Instructions" on page 15
- "Interior Trim Preparation" on page 16

Interior Mounting for Square D Brand Enclosures

A separate standards publication, titled "General Instructions for Proper Installation, Operation, and Maintenance of Panelboards Rated 600 Volts or Less" (NEMA PB1.1), has been provided with this equipment. Familiarize yourself with the content of this document before proceeding with any of the following procedures.

If you did not receive a copy of this document, or if you have any questions regarding this equipment, contact your local distributor or Schneider Electric representative.

CAUTION

HAZARD OF EQUIPMENT DAMAGE

- Ensure all connections are properly tightened.
- Refer to the torque information label provided on the panelboard before tightening the connections.

Failure to follow these instructions can result in equipment damage.

To properly mount and install the NQ panelboard or QONQ load center interior, please refer to the NEMA PB 1.1 standards publication, and follow the instructions below for either "Surface Mounting (Enclosure Mounted on Wall)" or "Flush Mounting (Enclosure Recessed in Wall)."

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Surface Mounting (Enclosure Mounted on Wall)

1. Mount the enclosure as instructed in the NEMA PB 1.1 standards publication.
2. Remove the interior trim from the trim brackets.
3. Install the interior as described below:
   a. Set the interior on the enclosure studs. An elevating screw is not required (See Figure 1 on page 8).
   b. Tighten the keps nuts against the interior side rails until the rails are against the back of the enclosure.
   c. Remount the interior trim after wiring.
4. If used as service entrance equipment, neutral bonding is required. See the “Neutral Bonding Strap/Cable Installation” instructions on page 9.
5. Apply equipment labels (located in the bag assembly) as directed by the instructions on the back of the equipment label sheet.

Flush Mounting (Enclosure Recessed in Wall)

1. Mount the enclosure as instructed in the NEMA PB 1.1 standards publication.
2. Remove the interior trim from the trim brackets.
3. Install the interior as described below:
   a. Thread the (4) 10-32 x .875 in. self-tapping, elevating screws provided with the flush trim into the side rails.
   b. Set the interior on the enclosure studs (see Figure 1 on page 8). Place the keps nuts onto the enclosure studs, but do not tighten.
   c. Adjust the screws so that the lip of the interior trim is approximately 0.25 inches (6.35 mm) from wall line.
   d. Tighten the keps nuts against the side rails.
   e. Remount the interior trim after wiring.
4. If used as service entrance equipment, neutral bonding is required. See the “Neutral Bonding Strap/Cable Installation” instructions on page 9.
5. Apply equipment labels (located in the bag assembly) as directed by the instructions on the back of the equipment label sheet.

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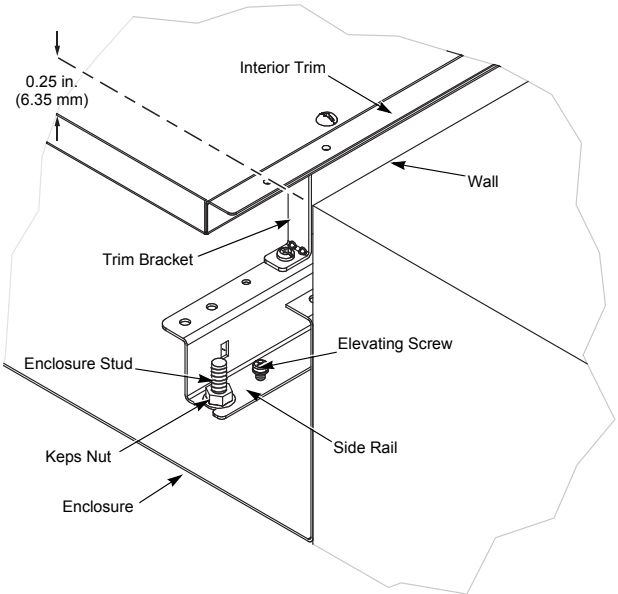
Figure 1: Interior Mounting of Square D Brand Enclosures



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Neutral Bonding Strap/Cable Installation

The neutral bonding strap/cable should be used only when the panelboard is **installed** as service equipment.

To properly bond the neutral to the panelboard, follow the instructions for either “100 or 250 A Maximum NQ Panelboards” or “400 or 600 A Maximum NQ Panelboards and QONQ Load Centers” below and on page 11, respectively.

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Turn OFF all power supplying this equipment before working on or inside the equipment.
- The main bonding strap/cable should be used only when the panelboard is installed as service equipment.
- Do not mix the mounting screws with the interior trim screws.

Failure to follow these instructions will result in death or serious injury.

NOTE: The bonding strap/cable parts are found in the bag assembly provided with the interior.

100 or 250 A Maximum NQ Panelboards

To install a neutral bonding strap on a 100 or 250 A maximum NQ panelboard, refer to Figure 2 and follow the instructions below.

1. Align the bonding strap on the side rail, as pictured.

   NOTE: For some applications, it may be necessary to remove the lug (not pictured) before installing the bonding strap.

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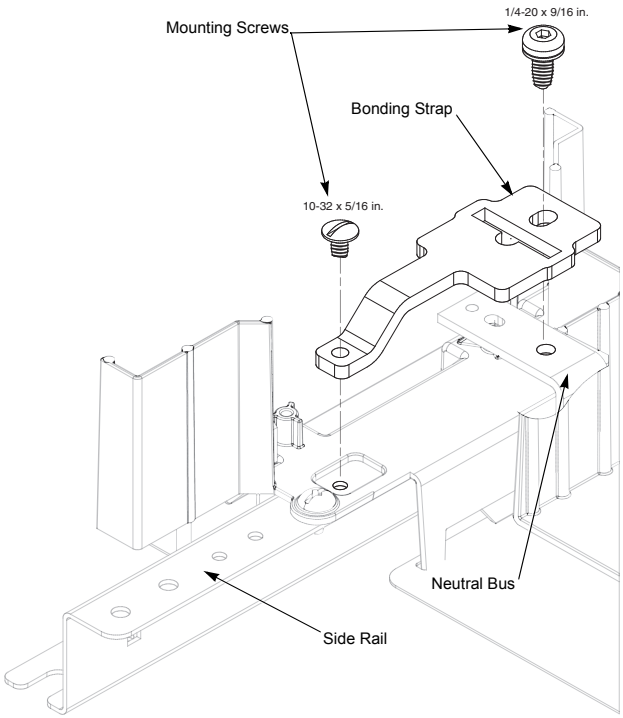
2. Insert the two mounting screws, as pictured. Tighten the 10-32 screw to 10–12 lb-in (1.1–1.4 N•m) and the 1/4-20 to 25–30 lb-in (2.8–3.4 N•m).

   NOTE: If the lug was removed in Step 1 above, reinstall it on top of the bonding strap. Use the 1/4-20 x 11/16 in. mounting screw with feed-through lug, sub-feed lug, sub-feed breaker, or 200% neutral applications. Use the 1/4-20 x 7/8 in. lug mounting screw with 200% neutral on 225 A applications with feed-through lug, sub-feed lug, or sub-feed breaker applications. Lug mounting screws are provided in the bonding strap bag assembly.

Figure 2: Bonding Strap Installation — 100 or 250 A Maximum NQ Panelboards



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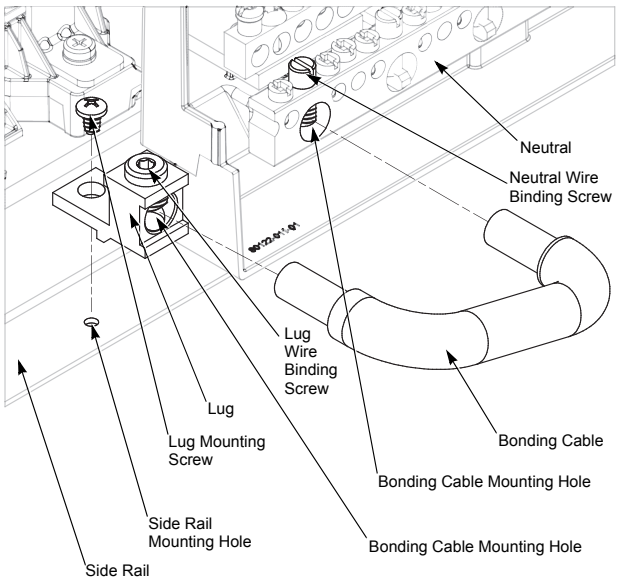
400 or 600 A Maximum NQ Panelboards and QONQ Load Centers

To install a neutral bonding cable on a 400 or 600 A maximum NQ panelboard and QONQ load center, refer to Figure 3 and follow the instructions below.

1. Align the lug on the side rail mounting hole, as pictured.
2. Tighten the lug mounting screw against the side rail to 10–12 lb-in (1.1–1.4 N•m).
3. Align the bonding cable, as pictured, and insert it into the lug and neutral mounting holes.
4. Tighten both the lug wire binding screw and the neutral wire binding screw to 45–50 lb-in (5.1–5.6 N•m).

Figure 3: Bonding Cable Installation — 400 or 600 A Maximum NQ Panelboards and QONQ Load Centers



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QO and QOB Circuit Breaker Installation and Removal

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E.
- This equipment must only be installed and serviced by qualified electrical personnel.
- Turn OFF all power supplying this equipment before working on or inside equipment.
- Always use a properly-rated voltage sensing device to confirm that all power is OFF.
- All unused spaces must be filled with blank fillers.
- Replace all devices, doors and covers before turning ON power to this equipment.

Failure to follow these instructions will result in death or serious injury.

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QO and QOB Breaker Installation

Refer to Figure 4 on page 14 for the following instructions:

1. Turn OFF all power to the panelboard.
2. Turn the breaker OFF.
3. Remove the interior trim.
4. Snap the wire terminal end of the circuit breaker onto the mounting rail.
5. Engage the branch connector.

   For QO Circuit Breakers:

   a. Push inward until the plug-on jaws fully engage the branch connector.

   For QOB Circuit Breakers:

   a. Push inward until the breaker connector is centered on the branch connector mounting hole. Engage the screw into the branch connector hole and tighten it to the torque values shown on the interior wiring and torque diagram.

6. Install the load wire.
7. Reinstall the interior trim.

QO and QOB Breaker Removal

Refer to Figure 4 on page 14 for the following instructions:

1. Turn OFF all power to the panelboard.
2. Remove the load wire.
3. Remove the interior trim.
4. Disengage the branch connector.

   For QO Circuit Breakers:

   a. Pull outward until the plug-on jaws fully disengage the branch connector.

   For QOB Circuit Breakers:

   a. Loosen the screw in the breaker connector and pull the breaker off of the branch connector.

5. Snap the wire terminal end of the circuit breaker off of the mounting rail.
6. Reinstall the interior trim.

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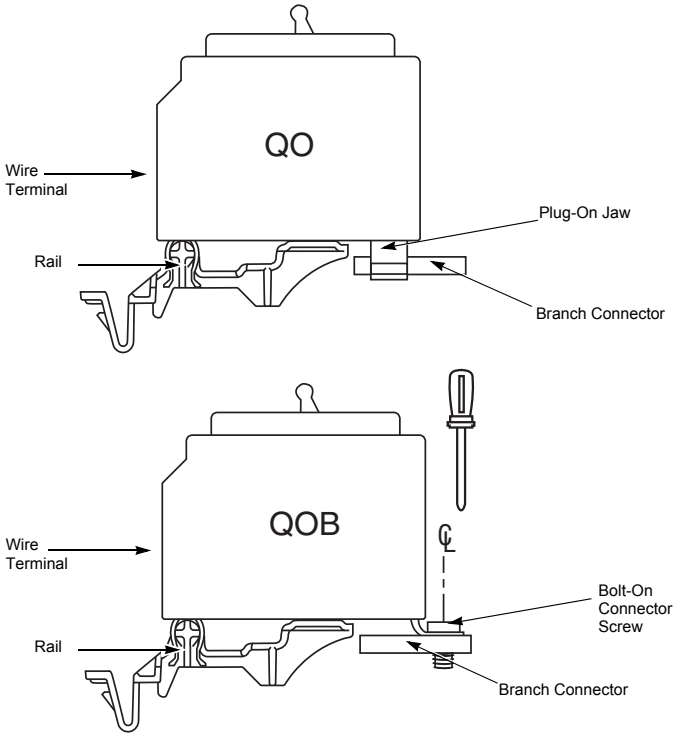
Figure 4: QO and QOB Circuit Breaker Installation and Removal



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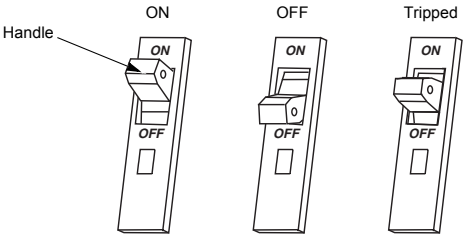
Circuit Breaker Reset Instructions

If the circuit breaker is tripped, the handle will be at the mid-position between ON and OFF. To reset the circuit breaker, push the handle to the OFF position, then to the ON position.

Figure 5: Circuit Breaker Handle Positions



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Interior Trim Preparation

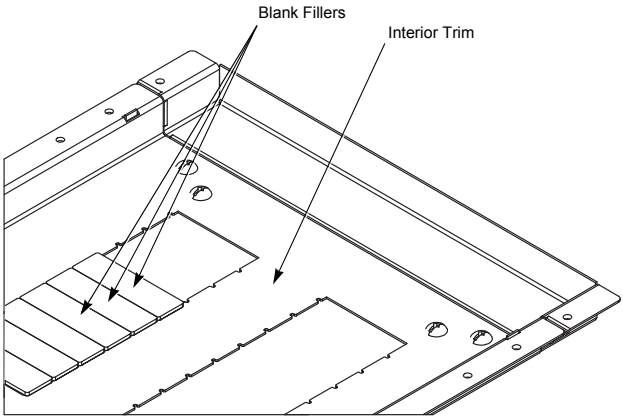
⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Before energizing the panelboard, all unused spaces must be filled with blank fillers.
- Replace all devices, doors, and covers before energizing this equipment.

Failure to follow this instruction will result in death or serious injury.

Figure 6: Interior Trim Diagram



NOTE: The back of the interior trim lists the catalog number for its corresponding compatible blank fillers.

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Appendix 1: Specifications

Typical Wiring

Table 1: Panelboard Typical Wiring[1]

	1-Phase Panelboards		3-Phase Panelboards	
Voltage AC	**Phase**	**Wires**	**Phase**	**Wires**
208Y/120	—	—	3	4
120/240	1	3	—	—
240[2]	1	2	3	3
240[3]	3	3	—	—
240/120[4]	—	—	3	4 Delta

1 Additional information is provided on the panelboard. See the main circuit breaker rating, if used.

2 For this system, the neutral is not used and only circuit breakers rated 240 V AC minimum should be used. Do not use circuit breakers rated 120 V or 120/240 V AC.

3 For a grounded “B” phase system, only circuit breakers rated 240 V AC minimum should be used. Do not use circuit breakers rated 120 V or 120/240 V AC.

4 When wiring for a delta system, phases “A” and “C” must be 120 V to neutral, phase “B” 208 V to neutral. Connect only circuit breakers rated 240 V AC minimum. Do not use circuit breakers rated 120 V or 120/240 V to “B” phase.

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Integral Main or Sub-Feed:
DJ, FI, KI, H, J, LA, LC, LH, QB, QD, QG, QJ, QO(B)VH

Figure 7: NQ/NQM 100–225 A Main Lugs or 100–250 A Main Breaker Diagram

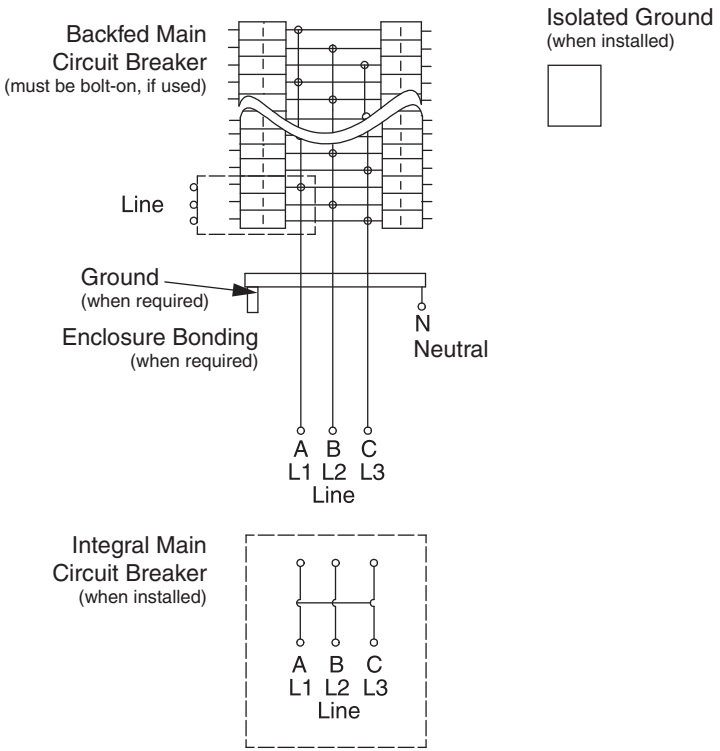

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Figure 8: NQ Panelboard or QONQ Load Center 400–600 A Main Lugs or Main Circuit Breaker with or without Feed-Through Lugs Diagram

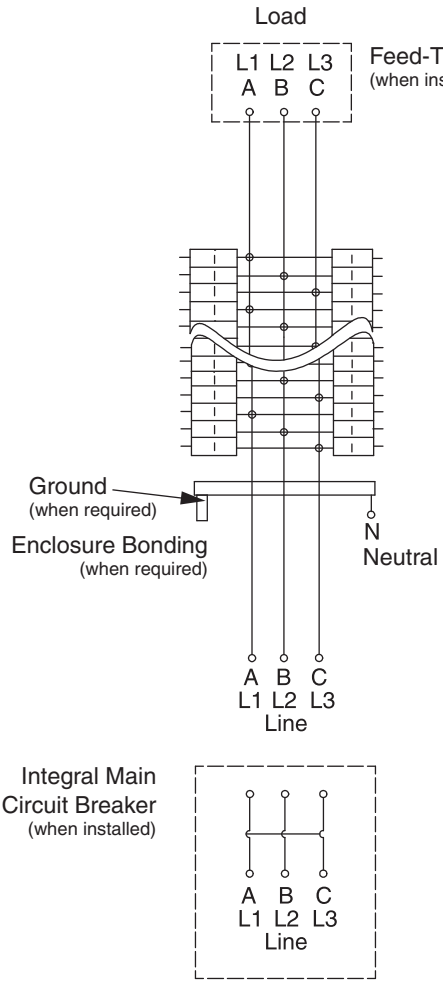

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Figure 9: NQ Panelboard or QONQ Load Center 400–600 A Main Circuit Breaker with Feed-Through Lugs or Sub-Feed Circuit Breakers Diagram

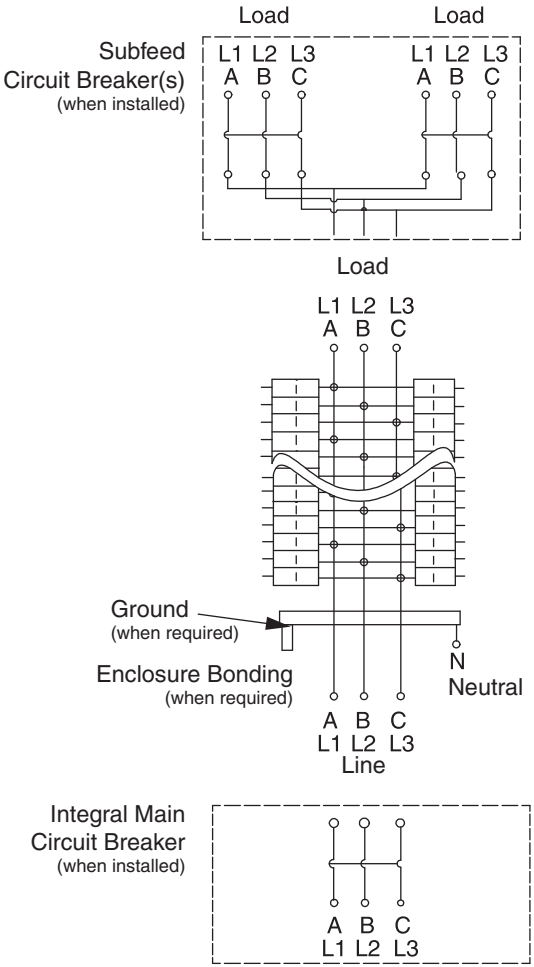

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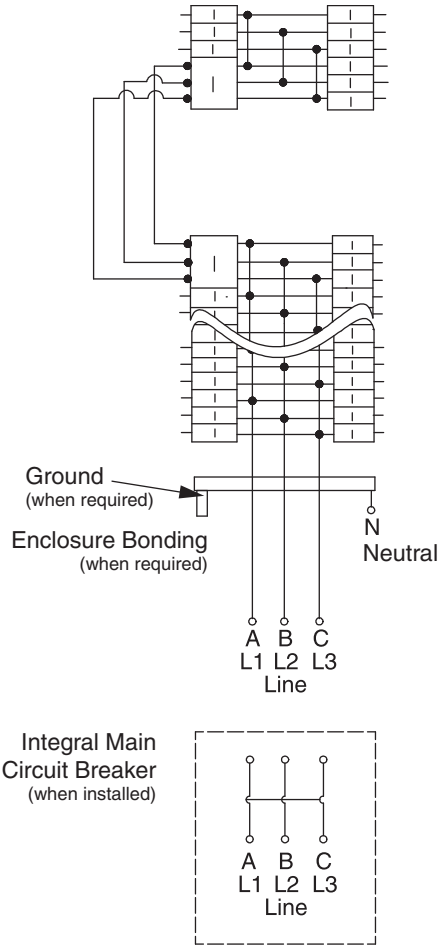
Figure 10: Typical NQ Panelboard with Split Bus Diagram



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Panelboard Ratings

Refer to NEC section 110-22 and CEC rule 14-014 for more information. The series rated system label is located in the bag assembly.

Table 2: Series Connected Breaker Ratings (RMS Symmetrical)

Max. System Voltage AC [1] [2]	Max. Short Circuit Current Rating	Square D Brand Integral or Remote Main Circuit Breakers and Remote Main Fuses	Square D Brand Branch Circuit Breaker Catalog Designation and Allowable Ampere Ranges [3] [4] [5] [6]			
			Type	1 Pole	2 Pole	3 Pole
120/240 1PH	22,000	MG	QO (B)	15–30A	—	—
	25,000	HD, JD	QO (B) PL		15–60 A	15–30 A
	65,000	HG, JG	QO (B) PL			
	100,000	HJ, JJ	QO (B) PL			
	125,000	HL, JL	QO (B) PL			
120/240 1PH 208Y/120	100,000	DJ 400A	QO (B)	15–70 A	15–125 A	—
			QO (B) GFI	15–30 A	40–60 A	—
			QO (B) AFI	15–20 A	—	—
			QO (B) AFI, QO (B) CAFI	15–20 A	—	—
			QO (B) VH	—	150 A	15–150 A
			QO (B) EPD	15–30 A	15–60 A	15–30 A
		QJ	QO (B)	15–70 A	15–125 A	15–30 A
			QO (B) AS	15–30 A	15–30 A	15–30 A
			QO (B) GFI	15–30 A	15–60 A	15–50 A
			QO (B) VH	—	150 A	35–150 A
			QO (B) PL	15–30 A	15–60 A	15–30 A
			QO (B) AFI	15–20 A	—	—
208Y/120	18,000	LA/LH (L) 34200MC	QO (B)	15–30A	15–30 A	15–30 A
		LA/LH (L) 34225MC				
		LA/LH (L) 34250MC				
		LA/LH (L) 34400MC				
	30,000	DJ-W 150 A MC[7]	QO (B)	15–70 A	15–70 A	—
			QO (B) GFI	15–30 A	15–60 A	—
			QO (B) AFI, QO (B) CAFI	15–20 A	—	—
			QO (B) EPD	15–30 A	15–60 A	—
			QO (B) VH	—	—	15–70 A

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Table 2: Series Connected Breaker Ratings (RMS Symmetrical) *(continued)*

Max. System Voltage AC [1] [2]	Max. Short Circuit Current Rating	Square D Brand Integral or Remote Main Circuit Breakers and Remote Main Fuses	Square D Brand Branch Circuit Breaker Catalog Designation and Allowable Ampere Ranges[3] [4] [5] [6]			
			Type	1 Pole	2 Pole	3 Pole
208Y/120	30,000	DJ-W 250 A MC[7]	QO (B)	15–70 A	15–100 A	—
			QO (B) GFI	15–30 A	15–60 A	—
			QO (B) AFI, QO (B) CAFI	15–20 A	—	—
			QO (B) EPD	15–30 A	15–60 A	—
			QO (B) VH	—	—	15–100 A
		DJ-W 400 and 600 A MC[7]	QO (B)	15–70 A	15–100 A	—
			QO (B) GFI	15–30 A	15–60 A	—
			QO (B) AFI, QO (B) CAFI	15–20 A	—	—
			QO (B) EPD	15–30 A	15–60 A	—
			QO (B) VH	—	—	15–100 A
240	22,000	QO (B) VH	QO (B)	15–70 A	15–125 A	15–100 A
			QO (B) AS	15–30 A	15–30 A	15–30 A
			QO (B) GFI	15–30 A	15–60 A	15–50 A
			QO (B) PL	15–30 A	15–30 A	—
			QO (B) AFI	15–20 A	—	—
		Q2-H	QO (B)	15–70 A	15–100 A	15–30 A
			QO (B) GFI	15–30 A	15–30 A	—
			QO (B) AFI	15–20 A	—	—
	25,000	QD	QO (B)	15–70 A	15–125 A	15–30 A
			QO (B) AS	15–30 A	15–30 A	15–30 A
			QO (B) GFI	15–30 A	15–60 A	15–50 A
			QO (B) VH	—	150 A	35–150 A
			QO (B) PL	15–30 A	15–60 A	15–30 A
			QO (B) AFI	15–20 A	—	—
		ED, FD	QO (B)	15–70 A	15–125 A	15–100 A
			QO (B) GFI	15–30 A	15–60 A	15–50 A
			QO (B) AFI	15–20 A	—	—
		KD	QO (B)	15–70 A	15–125 A	15–100 A
			QO (B) AS	15–30 A	15–30 A	15–30 A
			QO (B) GFI	15–30 A	15–60 A	—
			QO (B) AFI	15–20 A	—	—
		HD, JD	QO (B)	15–70 A	15–125 A	15–100 A
			QO (B) VH	—	—	35–150 A
			QO (B) GFI	15–30 A	15–60 A	15–50 A
			QO (B) AFI	15–20 A	—	—
			QO (B) H	—	15–100 A	—
			QOB 2150VH	—	150 A	—

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Table 2: Series Connected Breaker Ratings (RMS Symmetrical) *(continued)*

Max. System Voltage AC [1] [2]	Max. Short Circuit Current Rating	Square D Brand Integral or Remote Main Circuit Breakers and Remote Main Fuses	Square D Brand Branch Circuit Breaker Catalog Designation and Allowable Ampere Ranges [3] [4] [5] [6]			
			Type	1 Pole	2 Pole	3 Pole
240	42,000	LA, MA	Q2L-H	—	100–225 A	100–225 A
			QDL	—	70–225 A	70–225 A
		LC400A	QO (B)	15–70 A	—	—
			QO (B) VH	15–30 A	15–125 A	15–100 A
			QOBVH	—	150 A	—
			QO (B) GFI	15–30 A	15–60 A	—
			QO (B) AFI	15–20 A	—	—
		LC600A	QO (B) VH	15–30 A	15–125 A	15–100 A
			QOBVH	—	150 A	—
			QO (B) GFI	—	15–60 A	—
			QO (B) AFI	15–20 A	—	—
		MG	QO (B) VH	15–30 A	15–30 A	15–30 A
		HD, JD	QO (B) PL	15–30 A	15–60 A	15–30 A
	65,000	LC400A	QO (B)	15–30 A	—	—
			QO (B) VH	15–30 A	15–125 A	15–100 A
			QOBVH	—	150 A	—
			QO (B) GFI	15–30 A	—	15–50 A
			QO (B) AFI	15–20 A	—	—
		LC600A	QO (B) VH	15–30 A	15–125 A	35–100 A (3P208 V max) 15–30 A (3P240 V max)
			QOBVH	—	150 A	—
			QO (B) GFI	—	—	15–50 A
			QO (B) AFI	15–20 A	—	—
		DJ 400A	QO (B)	15–70 A	15–125 A	—
			QO (B) VH	—	150 A	15–150 A
			QO (B) H	—	15–100 A	—
		DJ__W	QO (B)	15–70 A	15–150 A	—
			QO (B)-AFI	15–20 A	—	—
			QO (B)-GFI	15–30 A	15–60 A	—
			QO (B)-VH	—	110–125 A	15–150 A
		DJ, DG, DL 150–600 A	QO (B) EPD	—	—	15–30 A
			QO (B) EPE	—	—	15–30 A
		EG, FG, KG	QO (B)	15–70 A	15–125 A	15–100 A
			QO (B) GFI	15–30 A	15–60 A	15–50 A
			QO (B) AFI	15–20 A	—	—

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Table 2: Series Connected Breaker Ratings (RMS Symmetrical) *(continued)*

Max. System Voltage AC [1] [2]	Max. Short Circuit Current Rating	Square D Brand Integral or Remote Main Circuit Breakers and Remote Main Fuses	Square D Brand Branch Circuit Breaker Catalog Designation and Allowable Ampere Ranges [3] [4] [5] [6]			
			Type	1 Pole	2 Pole	3 Pole
240	65,000	QG	QO (B)	15–70 A	15–125 A	15–30 A
			QO (B) AS	15–30 A	15–30 A	15–30 A
			QO (B) VH	—	150 A	35–150 A
		QG, HG, JG	QO (B) GFI	15–30 A	15–60 A	15–50 A
			QO (B) PL	15–30 A	15–60 A	15–30 A
			QO (B) AFI	15–20 A	—	—
		HG, JG	QO (B)	15–70 A	15–125 A	15–100 A
			QO (B) VH	—	—	35–150 A
			QO (B) H	—	15–100 A	—
			QO B2150VH	—	150 A	—
		FC_ or KC_22___	QO (B)	15–70 A	15–100 A	15–100 A
		FC_ or KC_32___	QO (B) AS	15–30 A	15–30 A	15–30 A
	100,000	FC_ or KC_24___	QO (B) GFI	15–30 A	15–30 A	—
		FC_ or KC_34___	QO (B) AFI	15–20 A	—	—
		DJ 400 A	QO (B) H	—	15–100 A	—
		EJ, FJ	QO (B)	15–70 A	15–125 A	15–100 A
			QO (B) GFI	15–30 A	15–60 A	15–50 A
			QO (B) AFI	15–20 A	—	—
		HJ, JJ	QO (B)	15–70 A	15–125 A	15–100 A
			QO (B) VH	—	—	35–150 A
			QO (B) GFI	15–30 A	15–60 A	15–50 A
			QO (B) PL	15–30 A	15–60 A	15–30 A
			QO (B) AFI	15–20 A	—	—
			QO (B) H	—	15–100 A	—
			QOB 2150VH	—	150 A	—
	125,000	HL, JL	QO (B)	15–70 A	15–125 A	15–100 A
			QO (B) AS	15–30 A	15–30 A	15–30 A
			QO (B) GFI	15–30 A	15–60 A	—
			QO (B) AFI	15–20 A	—	—
	200,000	FI, KI				

Continued on next page

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Table 2: Series Connected Breaker Ratings (RMS Symmetrical) *(continued)*

Max. System Voltage AC [1] [2]	Max. Short Circuit Current Rating	Square D Brand Integral or Remote Main Circuit Breakers and Remote Main Fuses	Square D Brand Branch Circuit Breaker Catalog Designation and Allowable Ampere Ranges [3] [4] [5] [6]			
			Type	1 Pole	2 Pole	3 Pole
240	65,000	400 A Max. Class J or T6 Fuses	QO (B) VH	15–30 A	15–125 A	15–100 A
			QOB-VH	—	150 A	—
			QO (B) AFI	15–20 A	—	—
	100,000	200 A Max. Class T3 Fuses	QO (B) AFI	15–20 A	—	—
	200,000	200 A Max. Class J or T6 Fuses and 400 A Max. Class T3 Fuses	QO (B)	15–70 A	15–125 A	15–100 A
			QO (B) AS	15–30 A	15–30 A	15–30 A
			QO (B) GFI	15–30 A	15–60 A	15–50 A

1 For shown circuit breakers rated less than this maximum voltage, the indicated short circuit current rating also applies, but at the voltage rating of the circuit breaker.

2 Short circuit tests are conducted at 100–105% of the maximum rated voltage of the panelboard.

3 Suffixes HID, SWD, and SWN may also be applied to the applicable branch circuit breakers shown above. Suffix SWN may **not** be applied in combination with LC main breakers.

4 Where QO (B) circuit breakers are shown above, QO (B) H, QO (B) VH, and QH (B) circuit breakers may also be used.

5 Where QO (B) GFI circuit breakers are shown above, QO (B) EPD and/or QO (B) EPE circuit breakers may also be used.

6 Where QO (B) AFI circuit breakers are shown above, QO (B) CAFI circuit breakers may also be used.

7 To achieve selective coordination, the rating of the DJ main circuit breaker must be at least two times greater than the ampere rating of any branch circuit breaker.

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Table 3: Short Circuit Current Rating[1] for Main Lug Interiors with Sub-Feed or Feed-Through Lugs

Maximum System Voltage AC	Maximum Current Rating	Branch Circuits	Application	Adder[2]	Maximum Short Circuit Current Rating[3]
240	100	18, 30	SFL and FTL	—	10,000
	225	30, 42, 54, 72, 84	SFL	6 inches (152.4 mm)	
		42	FTL	—	
		30, 54, 72, 84		6 inches (152.4 mm)	
	400	30, 42, 54, 72, 84	SFL	—	25,000
		30, 84	FTL	—	
		42, 54, 72		6 inches (152.4 mm)	
	600	30, 42, 54, 72, 84	FTL	12 inches (304.8 mm)	

1 This rating applies to main lug interiors, equipped with sub-feed or feed-through lugs, where the device feeding the interior is unknown or not a Square D brand device. Use of a Square D brand main circuit breaker ahead of these lugs will result in a rating equal to the rating of the breaker. Short circuit tests are conducted at 100–105% of the maximum rated voltage of the panelboard.

2 The adder is the additional length of the enclosure.

3 RMS symmetrical amperes, for three cycles.

CE Marking

Interiors with the “CE” mark meet the IEC 60439-1 standard.

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Appendix 2: Accessory Kits

An assortment of field-installable accessory kits are available for NQ panelboards:

- Equipment Ground Bar Kits
- Oversized Lug Kits for 100–250 A Panelboards
- Sub-Feed Lug Kits for 100–400 A Panelboards
- Main Lug Kits
  - — Mechanical Lug Kits — Aluminum
  - — Mechanical Lug Kits — Copper
  - — Versa-Crimp® Compression Lug Kits — Aluminum
  - — Versa-Crimp Compression Lug Kits — Copper

Equipment Ground Bar Kits

Equipment ground bar kits, suitable for copper or aluminum wire, meet the grounding needs of NQ panelboards and QONQ load centers.

Table 4: Equipment Ground Bar Kits Specifications

Panelboard		Use Ground Bar Kit Catalog Number	
Branch Circuit	**Mains Rating**	**Aluminum[1]**	**Copper[2]**
1–42	600 A Maximum	(1) PK27GTA	(1) PK27GTACU
54–84		(2) PK27GTA	(2) PK27GTACU

1 Aluminum bars suitable for 60° C or 75° C Copper or Aluminum conductors.

2 Copper bars suitable for 60° C or 75° C Copper conductors.

NOTE: Ground bar mounting locations are identified by the ground symbol ⏚ stamped into the backwall of the enclosure.

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Oversized Lug Kits for 100–250 A Panelboards

Oversized lug kits are available for applications where termination conductors of 3 AWG or larger are required for the neutral.

Table 5: Oversized Lug Kits for 100–250 A Panelboards Specifications

Circuit Breaker Rating	Kit Catalog Number	Wire Range
70 A	QO70AN	(1) 10–2 Al (1) 5.76–33.6 mm^2 (1)14–4 Cu (1) 2.08–21.1 mm^2
80–125 A	Q1100AN	(1) 4–1/0 Al/Cu (1) 42.4–53.5 mm^2
125–150 A	Q1150AN	(1) 1–4/0 Al/Cu (1) 42.4–107 mm^2

Sub-Feed Lug Kits for 100–400 A Panelboards

Sub-feed main lugs are available for 100, 225, or 400 A applications.

Table 6: Sub-Feed Lug Kits for 100–400 A Panelboards Specifications

Main Amps	Kit Catalog Number	Maximum Circuits
100	NQSFL1	18, 30
225	NQSFL2	30[1], 42[1], 54[1], 72[1], 84[1]
400	NQSFL4	30, 42, 54, 72, 84

[1] These panels require an additional 6 inches (152.4 mm) for the box and trim, for proper wire bending space.

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Main Lug Kits

Table 7: Mechanical Lug Kits — Aluminum

Panelboard Amps	Kit Catalog Number	Wire Range
100	Standard	#6–2/0 AWG 13.3–67.43 mm^2
225	Standard	#6–350 kcmil 13.3–177.3 mm^2
400	Standard	(1) 1/0–750 kcmil (2) 1/0–350 kcmil (1) 53.48–380 mm^2 (2) 53.48–177.3 mm^2
600	Standard	(2) 1/0–750 kcmil (2) 53.48–380 mm^2
	NQALM6A	(3) #6–250 kcmil (3) 13.3–127 mm^2

Table 8: Mechanical Lug Kits — Copper

Panelboard Amps	Kit Catalog Number	Wire Range
100	NQCUM1	#6–2/0 AWG 13.3–67.43 mm^2
225	NQCUM2	#6–250 kcmil 13.3–127 mm^2
400	NQCUM4	(1) 1/0–750 kcmil (2) 1/0–350 kcmil (1) 53.48–380 mm^2 (2) 53.48–177.3 mm^2
600	NQCUM6	

Table 9: Versa-Crimp® Compression Lug Kits — Aluminum

Panelboard Amps	Kit Catalog Number	Wire Range	Crimp Tool
100	NQALV1	#8–1/0 AWG 8.36–53.48 mm^2	VC6 (All)
225	NQALV2	#4–300 kcmil 21.15–152 mm^2	
400	NQALV4	(2) 2/0–500 kcmil (2) 67.43–253.4 mm^2	VC6-3, VC6-FT
600	NQALV6		

Table 10: Versa-Crimp® Compression Lug Kits — Copper

Panelboard Amps	Kit Catalog Number	Wire Range	Crimp Tool
100	NQCUV1	#6–1/0 AWG 13.30–53.48 mm^2	VC6 (All), VC7 (All)
225	NQCUV2	2/0–300 kcmil 67.43–152 mm^2	VC6-3, VC7, VC6-FT, VC7-FT
400	NQCUV4	400–750 kcmil 202.7–380 mm^2	VC6-FT, VC7-FT, VC8
600	NQCUV6	(2) 250–500 kcmil (2) 126.7–253.4 mm^2	VC6-3, VC7, VC6-FT, VC7-FT

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Schneider Electric USA
252 North Tippecanoe
Peru, IN 46970 USA
1-888-SquareD (1-888-778-2733)
www.us.SquareD.com

Electrical equipment should be installed, operated, serviced, and maintained only by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material.

80043-712-05

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Replaces 80043-712-04 10/2009

07/2010

16460

LV Dry Type Transformers

Product Data Sheet

EE75T3HFCU

Transformer Dry Type 75kVA 480D208Y120

List Price $21,155.00 USD

Availability **Stock Item: This item is normally stocked in our distribution facility.**

TRANSFORMER

Technical Characteristics

Full Capacity Taps	(6) 2.5% 2+4-
Temperature Rise	115 Degrees C
Weathershield	WS364 (purchase seperately)
Winding Material	Copper
Enclosure Code	20D
Enclosure Material	Painted Steel
Depth	20.00 Inches
Height	37.00 Inches
Enclosure Rating	NEMA 2
Width	30.00 Inches
Enclosure Type	Drip Proof (Indoor)
Insulation Temperature	220 Degrees C
Marketing Trade Name	Watchdog
Mounting Brackets	Wall: WMB363364 - Ceiling: CMB364
Mounting Type	Floor - Ceiling or Wall with mounting brackets
Phase	3-Phase
Primary	480VAC Delta
Rating	75kVA
Secondary	208Y/120VAC

Shipping and Ordering

Category	16283 -
Discount Schedule	PE2E
GTIN	00785901629566
Package Quantity	1
Weight	594 lbs.
Availability Code	Stock Item: This item is normally stocked in our distribution facility.
Returnability	Y
Country of Origin	MX

As standards, specifications, and designs change from time to time, please ask for confirmation of the information given in this document.

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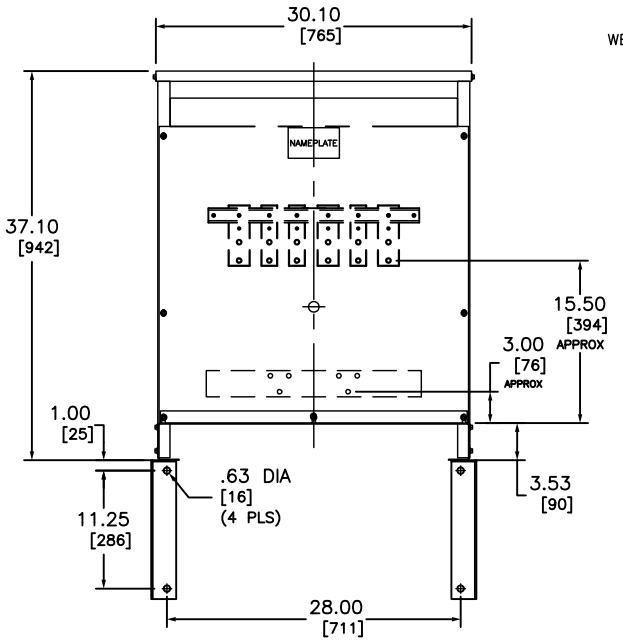
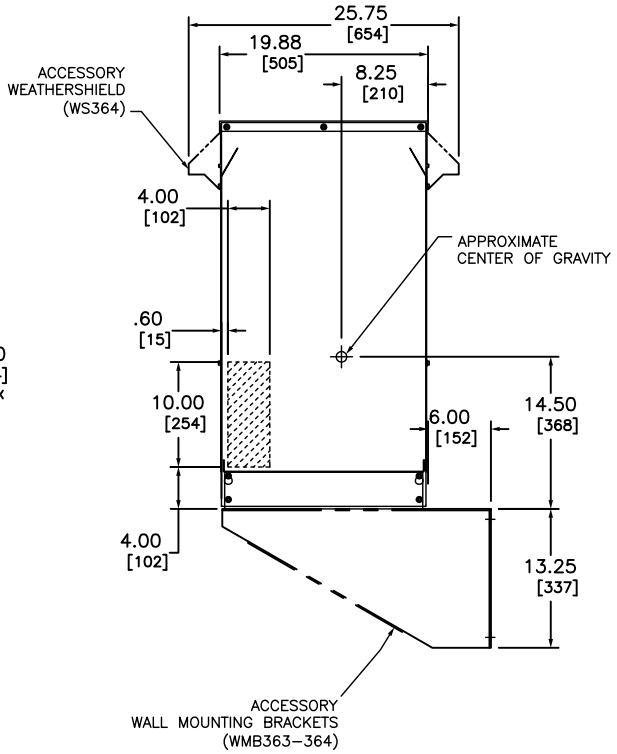
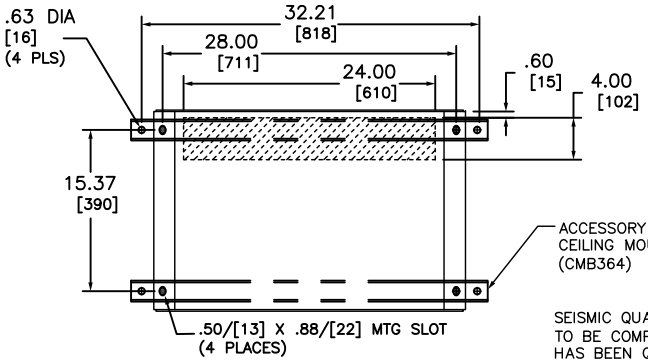
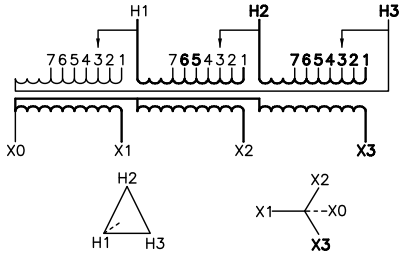






IN EACH PHASE CONNECT TO TAPS	
PRIMARY VOLTS	2–2.5% FCAN 4–2.5% FCBN
504	1
492	2
480	3
468	4
456	5
444	6
432	7



TRANSFORMER SPECIFICATIONS:

75 KVA 3Ø 60 HZ
PRIMARY VOLTAGE 480 DELTA
SECONDARY VOLTAGE 208Y/120
115°C RISE ABOVE 40°C AMBIENT
220°C INSULATION SYSTEM
COPPER WINDINGS
APPROXIMATE WEIGHT: 675 LBS
GUARANTEED SOUND LEVEL: 50 dB
EFFICIENCY @35%: 98.0% AVG. CONFORMS TO NEMA TP 1 – 2002 AND CSA C802.2

NOTES:
1) cULus LISTED (MEETING UL 1561 AND CSA C22.2)
2) NEMA 2 VENTILATED ENCLOSURE
ENCLOSURE RATED FOR NEMA 3R WHEN OPTIONAL WEATHERSHIELD ACCESSORY IS INSTALLED.
3) MINIMUM CLEARANCE OF 3.00[76] BETWEEN VENT OPENINGS, WALL OR OTHER OBSTRUCTION
4) SHADED AREAS DENOTE CUSTOMER CONDUIT ENTRANCE LOCATIONS, AVAILABLE BOTH SIDES AND BOTTOM

SEISMIC QUALIFICATION:
TO BE COMPLIANT WITH THE SEISMIC REQUIREMENTS OF ASCE/SEI 7, THIS UNIT HAS BEEN QUALIFIED BY SHAKE TABLE TESTING THROUGH SELF CERTIFICATION TO ICC ES AC156. CONTACT YOUR LOCAL SCHNEIDER ELECTRIC/SQUARE D REPRESENTATIVE FOR RELATED QUESTIONS.

DUAL DIMENSIONS: INCHES / MILLIMETERS

LOW VOLTAGE ENERGY EFFICIENT, TP1
DRY–TYPE TRANSFORMER
CATALOG NO EE75T3HFCU
3 PHASE, 75kVA, CU
PRIMARY 480 DELTA ,SECONDARY 208Y/120

SQUARE D
Schneider Electric

DWG# NO. 6312–0046

Instruction Bulletin

Replaces 43006-850-01, 12/1992

ENGLISH

Dry-Type Transformers 600 Volts and Below

General Installation, Operation, and Maintenance

Class 7410

Retain for future use.

SAFETY PRECAUTIONS

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E.
- This equipment must only be installed and serviced by qualified electrical personnel.
- Turn off all power supplying this equipment before working on or inside equipment.
- Always use a properly rated voltage sensing device to confirm power is off.
- Replace all devices, doors and covers before turning on power to this equipment.

Failure to follow these instructions will result in death or serious injury.

RECEIVING, HANDLING, AND STORING

RECEIVING

Inspect new transformers when received for damage during shipment. Upon receipt, check the packing list against the equipment received to ensure the order and shipment are complete. Claims for shortages or errors must be made in writing to Schneider Electric within 60 days after delivery. Failure to give such notice will constitute unqualified acceptance and a waiver of all such claims by the purchaser.

Immediately inspect the equipment for any damage which may have occurred in transit. If damage is found or suspected, file a claim with the carrier immediately and notify Schneider Electric. Delivery of equipment to a carrier at any of the Schneider Electric/Square D® plants or other shipping points constitutes delivery to the purchaser regardless of freight payment and title. All risk of loss or damage passes to the purchaser at that time.

For details concerning claims for equipment shortages and other errors, refer to “Terms and Conditions of Sale”.

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HANDLING

Keep all transformers in the upright position in which they were shipped. Use lifting cables or chains with spreader bars to avoid damage to the finish or parts. Whenever there are no external lifting provisions, remove the top cover. Secure cables or chains to the top core-clamping channels or angles where holes are provided for this purpose.

Lifting with hand trucks or fork lifts is permissible if the blades or forks are long enough to pass completely under the enclosure. Since most dry-type transformers have a high center of gravity and are top heavy, extreme caution should be exercised when lifting or moving units in this manner.

Rolling may be used to move a dry-type transformer if the shipping skids remain attached to the base.

For superficial or minor case part damage, spare parts may be available. Contact your local Schneider Electric/Square D distributor.

STORING

Store dry-type transformers, preferably in a warm, dry location with a uniform temperature. Cover ventilation openings to keep out dust. If it is necessary to leave a transformer outdoors, protect it completely to prevent moisture and foreign material from entering the equipment. Install space heaters or small electric heaters to prevent or greatly reduce condensation and moisture. If condensation is evident, it may be necessary to dry out the unit.

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Turn off power supplying this equipment before working on it.
- Discharge all static charges held by coils.

Failure to follow these instructions will result in death or serious injury.

INSTALLATION

Keep these factors in mind when placing dry-type transformers:

- accessibility
- ventilation
- atmospheric conditions

STORED TRANSFORMERS OR TRANSFORMERS ALREADY PLACED IN SERVICE

If a transformer has been moved or stored, remove access panels or plates to inspect the equipment.

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

Do not remove access panels or plates while the transformer is energized.

Failure to follow this instruction will result in death or serious injury.

Internally inspect the equipment for:

- damage or displacement of parts.
- loose or broken connections.
- cracked insulators.
- dirt or foreign material.
- presence of water or moisture.

Refer to “Maintenance” on page 5 for additional inspection guidelines.

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LOCATION/PLACEMENT OF VENTILATED AND NON-VENTILATED TRANSFORMERS

Ventilated dry-type transformers normally are designed for installation in dry locations. They will, however, operate successfully while energized where the humidity is high. Under this condition, though, it may be necessary to take precautions to keep them dry if they are shut down for prolonged periods. Refer to “Operation” on page 5 for more detailed information.

Avoid placement of the transformer where dripping water exists. If this is not possible, provide suitable protection to prevent water from entering the transformer enclosure. Also, take precautions to guard against accidental entrance of water, such as from an open window, by a break in a water or stream line, or from use of water near the transformers.

Ventilated general purpose dry-type transformers are supplied in enclosures rated NEMA 2 for indoor installation. Weather shield kits are available to convert these enclosures for Underwriters Laboratories® (UL®) outdoor NEMA 3R use. Obtain the appropriate weather shield kit number from the transformer front panel label or from a Schneider Electric/Square D distributor or representative.

NOTE: Non-ventilated, resin-filled transformers are rated indoor/outdoor and do not require weather shield kits for outdoor use.

Adequate ventilation is essential to properly cool ventilated transformers. Clean, dry air is desirable. Filtered air may reduce maintenance if the location of the transformer presents a particular problem. Refer to National Electrical Code® (NEC®) Article 450. Forced air cooling should provide a minimum of 100 CFM per KW of losses (based on 40° C maximum ambient).

Place and install dry-type transformers in areas free from unusual dust-producing mediums or chemical fumes.

Non-ventilated transformers can be mounted directly on a wall. Consider accessibility for maintenance when placing the transformer. If the transformer will be placed near combustible materials, the minimum separations established by the NEC should be maintained.

The transformer enclosure is designed to prevent the entrance of most small animals and foreign objects.

GROUNDING

Permanently and adequately ground the enclosure and core assembly of these transformers in accordance with NEC requirements. Windings may be grounded with consideration given to local conditions in accordance with the NEC.

SEISMIC QUALIFICATIONS

Seismic qualification of nonstructural components by Schneider Electric is just one link in the total chain of responsibility required to maximize the probability that the equipment will be intact and functional after a seismic event. The equipment manufacturer determines that the equipment will be functional following a seismic event via shake-table testing programs. The seismic qualification testing results validate that Schneider Electric equipment will perform the intended function after the earthquake. However, the foundation and the anchorage system must also meet the applicable building codes and standards for the entire installation to maintain post earthquake functionality. Equipment inadequately mounted or mounted to weak or flexible foundations will not meet the requirements.

The equipment specifier/installer determines that the equipment is rigidly supported and will not leave its foundation during a seismic event. During an earthquake, the equipment must be able to transfer the loads that are created through the mounting pad and anchorage to the load-bearing path of the building structural system. If the equipment is not attached to the building structure in accordance with the minimum standards recommended

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herein, the complete equipment installation might become too flexible and may overturn or shear the attachment devices and slide off its foundation.

The structural civil engineer or design engineer of record is responsible for detailing the equipment connection and anchorage requirements (including the lateral restraint system if appropriate) for the given installation. The installer and manufacturers of the anchorage and lateral restraint system are responsible for ensuring that the mounting requirements are met. Schneider Electric/Square D is not responsible for the specification and performance of these anchorage systems.

Drawings are available that include specific mounting information for seismic qualifications. Contact your local Schneider Electric/Square D representative or call 1-888-Square D (1-888-778-2733) to obtain these drawings.

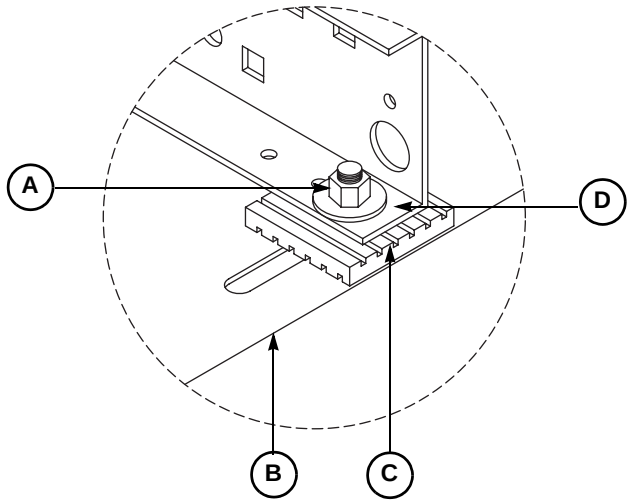
SOUND CONTROL

All transformers emit sound. This is caused by the alternating voltage applied to the transformer. The resulting magnetic field causes the core steel to expand and contract, resulting in audible sound. The transformer has been designed to minimize the level of sound produced.

During manufacture, sound isolation pads are secured between the transformer mounting bracket and the enclosure using bolts and nuts (Figure 1). The mounting hardware is tightened prior to shipment to prevent damage. To reduce audible sound levels further, back off the nut 1/4-inches (5 mm) to float the transformer on the isolation pads, isolating the transformer from the enclosure.

Figure 1: Isolation Pads for “Quiet Operation”

A. Back off the nut approximately 1/4 in. (5 mm) after installation
B. Base assembly
C. Isolation pad
D. Core clamp



Additionally, the area where the transformer is located can affect the sound level:

- Try to avoid installing the transformer in a corner, narrow hall, or in an area with smooth surfaces. Doing so can result in the sound being reflected and amplified.
- Securely fasten all the enclosure panels. Panel looseness can result in rattling, thereby increasing the sound produced.
- Use flexible conduit, if possible.
- Ensure that the type of structure on which the transformer is mounted is strong enough to support the weight of the transformer(s).

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Once installed, the sound level may exceed the NEMA tested level due to some of the points previously illustrated. The NEMA maximum allowable average of the readings in decibels is listed in Table 1:

Table 1: Sound Levels

Transformer kVA Rating	NEMA Sound Levels
0–9	40 dB
10–50	45 dB
51–150	50 dB
151–300	55 dB
301–500	60 dB
501–700	62 dB
701–1000	64 dB

OPERATION

EFFECTS OF HUMIDITY

Humidity conditions are unimportant as long as the transformer is energized. However, follow the precautionary steps listed below if the transformer is de-energized, is allowed to cool to ambient temperature, and will exceed a shutdown of 12 hours (especially in high humidity conditions).

1. Place small strip heaters in the bottom of the unit shortly after shutdown to maintain the temperature of the unit a few degrees above that of the outside air.
2. Inspect the unit for evidence of moisture before returning it to service.
3. Check the insulation resistance. If evidence of moisture exists, or if the insulation resistance is less than 1 megohm, dry out the transformer by placing it in an oven or by blowing heated air over it.

ENCLOSURE TEMPERATURE

The temperature rise on the enclosure exterior for ventilated transformers should not exceed 50° C (122° F), except as indicated in UL 1561.

MAINTENANCE

Transformers require periodic maintenance and inspections to ensure the most satisfactory service from the equipment and successful operation of it. Inspect the equipment at regular intervals, and perform corrective measures when necessary.

PERIODIC MAINTENANCE AND INSPECTION

The frequency at which transformers should be inspected depends on operating conditions. For clean, dry locations, annual inspections may be sufficient. However, for other locations, such as where the air is contaminated with dust or chemical fumes, an inspection at three- or six-month intervals may be required. Usually after the first few inspection periods, a definite schedule can be set up based on the transformer's existing conditions.

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⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Turn off power supplying this equipment before working on it.
- Discharge all static charges held by coils.

Failure to follow these instructions will result in death or serious injury.

1. De-energize the transformer, and remove the access covers. Inspect for:
   - — dirt on insulating surfaces and at areas which tend to restrict air flow.
   - — loose connections.
   - — the condition of tap changers or terminal boards.
   - — the general condition of the transformer.
2. Observe for signs of overheating and for voltage creepage over insulating surfaces, evident by tracing or carbonization.
3. Check for evidence of rusting, corrosion and deterioration of the paint. Corrective measures should be taken where necessary.

CLEANING

Remove excess dirt accumulations from the transformer windings and insulators to permit free circulation of air and to guard against the possibility of insulation breakdowns. Additionally, carefully and thoroughly clean the top and bottom ends of winding assemblies and ventilation ducts.

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Turn off power supplying this equipment before working on it.
- Discharge all static charges held by coils.

Failure to follow these instructions will result in death or serious injury.

1. De-energize the transformer, and clean the windings with a vacuum cleaner, a blower, or with compressed air. Use clean, dry compressed air; apply it at relatively low pressure (not over 25 psi).

   NOTE: A vacuum cleaner is preferred as the first step in cleaning, followed by the use of compressed air.
2. Brush and wipe lead supports, tap changers and terminal boards, bushings, and other major insulating surfaces with a dry cloth.
3. Do not use liquid cleaners because some of them have a solvent or deteriorating effect on most insulating materials.

CONNECTIONS AND CONTACT SURFACES

A clean contact surface area is necessary. Therefore, terminals must be clean. If transformers are installed outdoors or in a harsh environment, seal the connections with approved electrical joint compound. Apply the compound to exposed connections and the surface area before a bolted connection is made.

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REPLACEMENT PARTS AND ACCESSORIES

Table 2 lists available transformer lug kits. For additional information regarding terminal connectors, refer to the label on the transformer, on the reverse side of the front panel.

Table 2: VERSAtile™ Compression Lugs and Mechanical Set-Screw Types—UL Listed Lugs AL9CU (90° C Rated)

Transformer kVA Sizes	Kit Catalog Number	Terminal Lugs		Aluminum or Copper Conductor Range (AWG or kcmil)	Hardware Included	
		Qty.	Catalog Number		Qty.	Type
VERSAtile Compression Equipment Lugs						
15–37 1/2 1Ø	VCELSK1	8	VCEL02114S1	#8–1/0	8	1/4 in. x 1 in. cap screws
15–45 3Ø		5	VCEL030516H1	#4–300 kcmil	1	1/4 in. x 2 in. cap screws
50–75 1Ø	VCELSK2	13	VCEL030516H1	#4–300 kcmil	8	1/4 in. x 1 in. cap screws
75–112 1/2 3Ø					8	1/4 in. x 2 in. cap screws
100–167 1Ø 150–300 3Ø	VCELSK3	3 26	VCEL030516H1	#4–300 kcmil	3	1/4 in. x 3/4 in. cap screws
			VCEL07512H1	#500–750 kcmil Al 500 kcmil Cu	16	3/8 in. x 2 in. cap screws
500 3Ø	VCELSK4	34	VCEL07512H1	#500–750 kcmil Al 500 kcmil Cu	21	3/8 in. x 2 in. cap screws
Mechanical Set– Screw Type Lugs						
15–37 1/2 1Ø	DASK1	8	DA2	#14–#2	9	1/4 in. x 3/4 in. cap screws
15–45 3Ø		5	DA250	#6–250 kcmil		
50–75 1Ø	DASK2	13	DA250	#6–250 kcmil	8	1/4 in. x 1 in. cap screws
75–112 1/2 3Ø					8	1/4 in. x 1 3/4 in. cap screws
100–167 1Ø	DASK3	3	DA250	#6–250 kcmil	3	1/4 in. x 1 in. cap screws
150–300 3Ø		26	DA600	#2–600 kcmil	16	3/8 in. x 2 in. cap screws
500 3Ø	DASK4	34	DA600	2–600 kcmil	21	3/8 in. x 2 in. cap screws

NOTE: Refer to UL 486A for torque values to be used with lug connection hardware.

To order replacement enclosure parts and other accessories, refer to the transformer section in the Schneider Electric *Digest,* and call 1-888-Square D (1-888-778-2733).

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ENGLISH

Schneider Electric USA
6 Commercial Road
Huntington, IN 46750 USA
1-888-SquareD (1-888-778-2733)
www.us.SquareD.com

Electrical equipment should be installed, operated, serviced, and maintained only by qualified personnel. No responsibility is assumed by Schneider Electric for any consequences arising out of the use of this material.

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16511

Interior Luminaires

IMX

LINEAR FLUORESCENT HIGH BAY

PRODUCT HIGHLIGHTS

- High efficiency T5 & T8 lamps for significant energy savings over HID high bays.
- Unit may be pendant, chain or surface mounted
- Hub mounting option allows single-point mount for direct replacement of HID High Bays
- Available in 4', and 8' lengths
- Shallow fixture depth 3-7/32
- Minimum fixture weight - less load on building structure

CONSTRUCTION - Fixture housing, end sections, and lampholders of code gauge die formed steel, standard reflector of code gauge die formed aluminum, MIRO 4 finish.

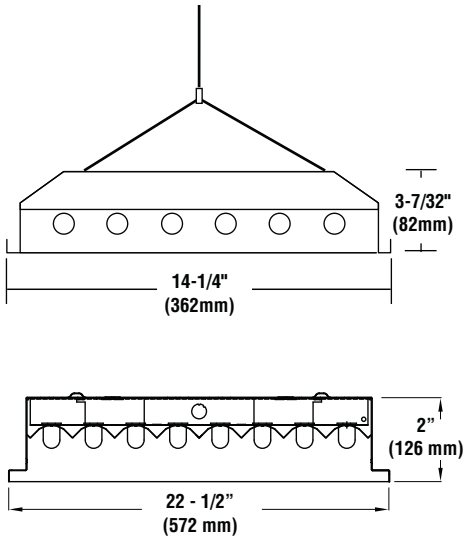
ELECTRICAL - All devices UL/CUL listed. Suitable for damp locations. Damp location emergency pack must be specified separately. Ballasts are energy-saving, solid-state electronic. Ballasts and lampholders replaceable without removing from ceiling. Discrete voltage must be specified for emergency pack options when wired with flex. Where lamps are included as part of the fixture, lamp CRI and color temperature must be specified.

FINISH - All metal parts and housing are finished with high reflectance, lighting fixture white polyester powder after fabrication.

PHOTOMETRICS - Please visit our web site at www.lsi-industries.com for detailed photometric data.

c UL us LISTED

DIMENSIONS



IMX-832 XSECTION

LUMINAIRE ORDERING INFORMATION

TYPICAL ORDER EXAMPLE: **IMX 4 54 SS5HO EMDL UE**

Prefix	Lamps	Lamp Type	Ballasts	Options	Voltage
IMX	2 3 4 6 8	54 - 54W 46" T5 HO	SS5HO - T5HO Progam Rapid Start SSO - T8 Instant Start SSOD - T8 Dimming (specify type) SSOL - T8 Low Watt SSOHL- T8 High Ballast Factor SSOHLR- T8 Program Start High Ballast Factor SSOR - T8 Rapid Start (For dual ballasts add "2". Example: SSO2. Specify if special configuration required. Example: 2 lamp/4 ballast)	F - Fusing EM - Emergency Pack EMDL - Emergency Pack - Damp Location OCS - Occupancy Sensor (specify type)[1]* WHT - White Reflector HUB - Hub Mounting Hardware 3/4" NPS U - Uplight reflector CHS IMX - V hook chain set (see mounting accessories) LM - Lamps Installed (specify type) *(See Fluorescent Highbay Accessories for more options)	120 - 120V 277 - 277V 347 - 347V UE - Universal Electronic (120-277V)
	4 6 8	32 - 32W 48" T8 Note: Add -2 for tandem units			

ACCESSORY ORDERING INFORMATION (Accessories are field installed)

Description	Order Number
Wire Guard	WG-IMX
Prismatic Acrylic Lens Door Assembly	PAX-A
Clear Acrylic Lens Door Assembly	PAX-C
*SEE FLUORESCENT HIGHBAY ACCESSORIES PAGE	

FOOTNOTES:

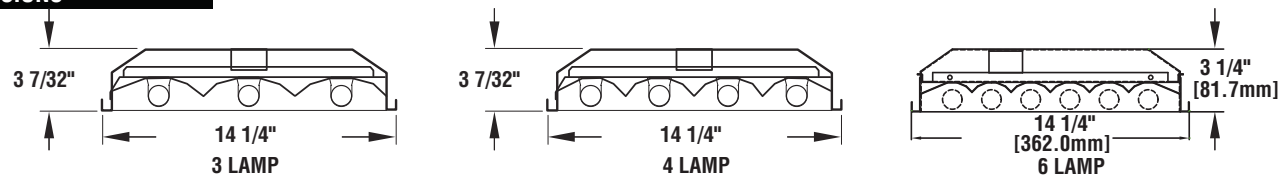
1 - Can only be used with Programmed Start ballast.

CASCADE LIGHTING REPRESENTATIVES 503.242.2522

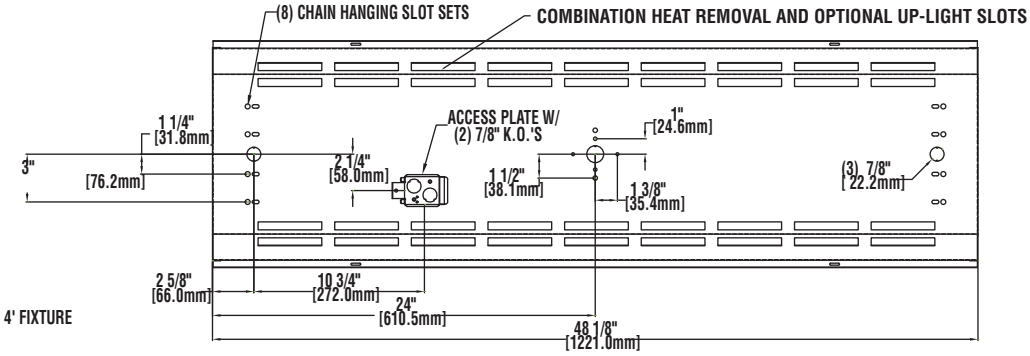
City of Jefferson - Public Works Building
TYPE: C
IMX-454-SS5HO-CHS/IMX-3-UE 3' CHAIN

IMX (3,4 & 6 LAMP)

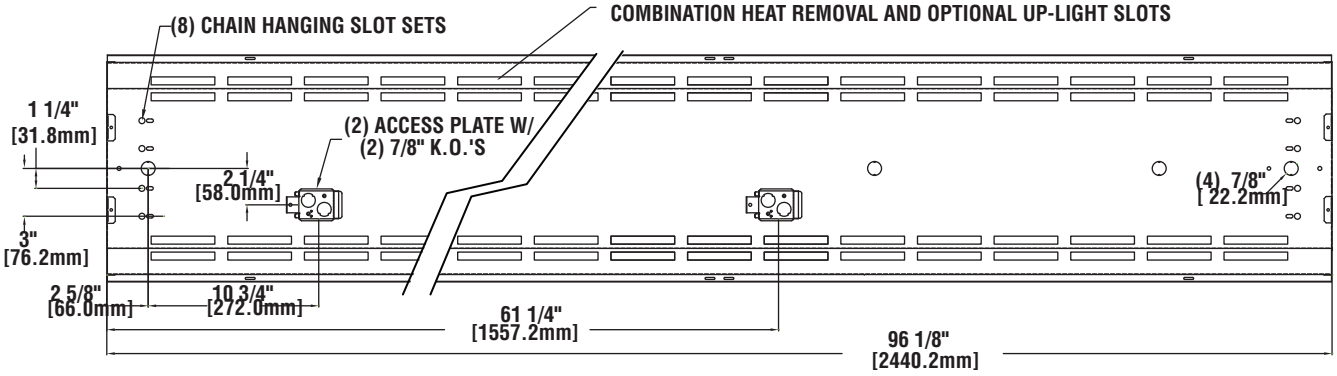
DIMENSIONS



MOUNTING

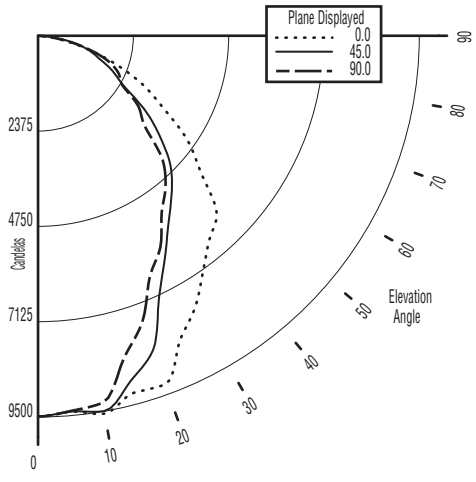


4' FIXTURE



8' FIXTURE

PHOTOMETRICS



Catalog#IMX-454-HO-SSO
Report#11687
Spacing Criterion 1.24 (0-180) x 0.98 (90-270)
Yearly Cost of 1000 Lumens, 3000 Hours of 0.08 KWH = 2.7

Candle Power Summary

Vertical Degree	Horizontal Angle 0	45	90
0	9496	9496	9496
5	9411	9407	9393
10	9568	9504	9293
15	9218	8914	8303
20	9257	8360	7599
25	8374	7148	6605
30	7831	6340	6097
35	7173	5676	5375
40	6644	5179	4943
45	6308	4693	4400
50	5297	4006	3452
55	4557	3277	3048
60	3610	2437	2405
65	2884	2033	2216
70	2055	1590	1872
75	1268	1265	1322
80	632	789	711
85	175	257	196
90	0	0	0

Efficiency 106.10%

LER FI-89

Zonal Lumen Summary

Zone	Lumens	%Lamp	%Fixt
0-30	6845.93	34.2	32.3
0-40	10616.88	53.1	50
0-60	17401.24	87	82
0-90	21226.34	106.1	100
90-120	0	0	0
90-130	0	0	0
90-150	0	0	0
90-180	0	0	0
0-180	21226.34	106.1	100

Coefficients Of Utilization - Zonal Cavity Method
Effective Floor Cavity Reflectance 0.20

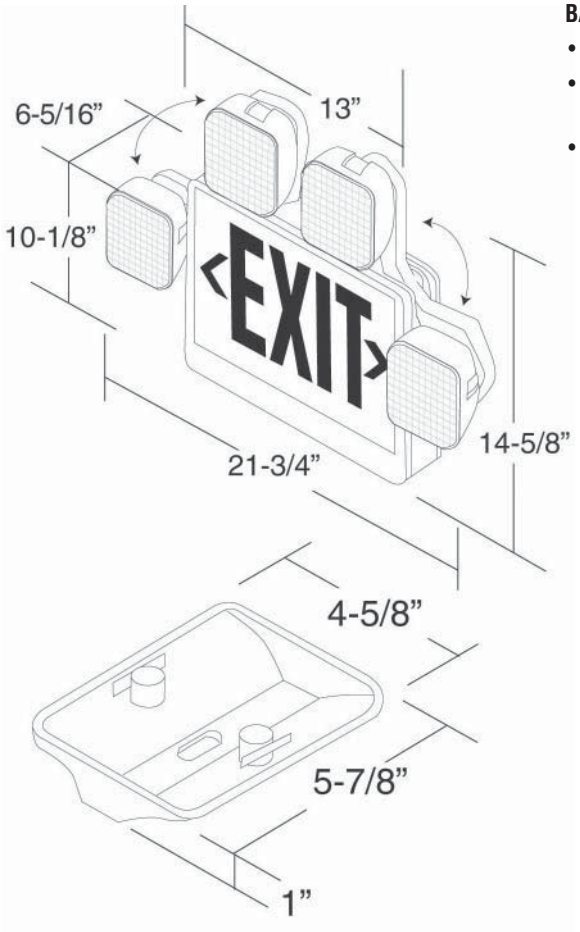
RC	80				70				50		
RW	70	50	30	10	70	50	30	10	50	30	10
0	126	126	126	126	123	123	123	123	118	118	118
1	116	111	107	103	113	109	105	101	104	101	98
2	106	98	91	85	103	96	89	84	92	87	82
3	97	87	78	72	95	85	77	71	82	75	70
4	89	77	68	61	87	76	68	61	73	66	60
5	83	69	60	54	80	68	60	53	66	58	53
6	77	63	54	47	75	62	53	47	60	52	47
7	71	57	48	42	69	56	48	42	55	47	42
8	66	53	44	38	65	52	44	38	50	43	37
9	62	48	40	34	61	48	40	34	47	39	34
10	59	45	37	31	57	44	37	31	43	36	31

CASCADE LIGHTING REPRESENTATIVES
503.242.2522

City of Jefferson - Public Works Building
TYPE: C
IMX-454-SS5HO-CHS/IMX-3-UE 3' CHAIN

PRX - THERMOPLASTIC COMBO EXIT / EMERGENCY

DIMENSIONS



HOUSING

- Contractor Oriented Snap Together Design
- Universal Chevron and Face Selection
- Unique "Swing-to-Position" Head Design
- High Impact Thermoplastic

ILLUMINATION

- L.E.D. source - available in long life, high output red or green
- Low Energy consumption
- Fully Illuminated 6 Inch Letter with ¾" Stroke
- Fully Adjustable 6 volt 5.4 Watt Heads

BATTERY

- 6 volt Lead Calcium Battery Standard
- 10 Yr. Life Expectancy within 65°F-85°F Operating Temps
- Optional 12 watts of Remote Capacity Available

ELECTRONICS

- 120/277 Dual Voltage
- Low voltage Disconnect Protection
- Solid State Charger
- Automatic Brown out protection
- Momentary Test Switch with LED Indicator

MOUNTING

- Universal Mount with Canopy

CODE CONFORMANCE & STANDARDS

- UL 924
- N.E.C, OSHA
- N.F.P.A. Life Safety Code 101

ORDERING INFORMATION

TYPICAL ORDER EXAMPLE: **PRX R U WB WH PR50 R12**

Prefix	Letter Color	# of Faces	Battery	Housing	Lamp Heads	Options
PRX - Combo	R - Red G - Green	U - Universal Includes 2 Face Plates, Back Plate, and Mounting Canopy	WB - With Battery	WH - White BK - Black	PR50 - 5.4 Watt H.I.T. Lamp	R12- 12 Watts Remote Capacity WG- (*) See Wire Guard Chart PG-(*) Polycarb Guards (see chart)

LITHONIA LIGHTING®

Catalog Number	LIF6 2/13DTT MVOLT BDP F6LD3	
Notes JEFFERSON SANDING SHED		Type F

FEATURES & SPECIFICATIONS

INTENDED USE

Recessed frame-in rated IC for new construction only.

Approved for all ceiling and wiring types.

CONSTRUCTION

Steel housing.

Galvanized bar hangers span up to 24" o.c. and feature built-in nailer and T-bar clips.

Galvanized steel junction box with four built-in romex clamps; two 1/2" and four 3/4" knockouts with slots for pryout.

Maximum 8 (4in 4out) No. 12 AWG conductors.

Rated for 90° C supply wire.

Ground wire provided.

Removable J-box doors for easy access.

ELECTRICAL SYSTEM

Socket assembly attaches to reflector to ensure proper and consistent lamp position.

Class P thermally protected ballast protects against improper contact with insulation. Approved for through-branch circuit wiring.

MVOLT 120-277V electronic ballast standard (4-pin lamp).

INSTALLATION

2 x 8 wood joist or T-bar installation.

Expandable bar hangers allow for off-center mounting in wood joist or T-bar ceilings. Bar hangers expand to length of 25-1/4" maximum, 13-1/4" minimum.

Reflector is secured to housing by mechanical trim retention. Vertically adjustable yoke allows for flush mounting of trims to ceiling face.

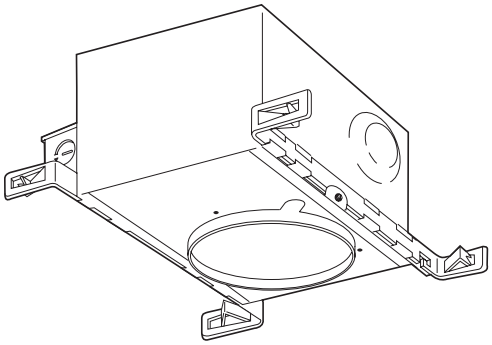
Accomodates ceilings up to 1-1/2" thick.

LISTING

UL listed to US and Canadian safety standards.

Damp location listed.

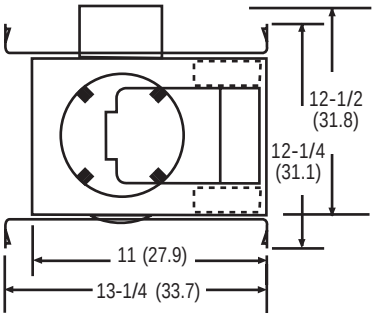
See trim selection for wet location listing.

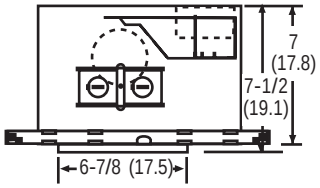


6" Housing

LIF6

FLUORESCENT
IC
New Construction





Specifications

Height: 7-1/2 (19.1)
Length: 13-1/4 (33.7)
Width: 12-1/2 (31.8)
Ceiling Opening: 7-1/16 (17.9)

All dimensions are inches (centimeters).

ORDERING INFORMATION

Example: **LIF6 2/13DTT MVOLT**

Choose the boldface catalog nomenclature that best suits your needs and write it on the appropriate line. Order accessories as separate catalog number.

LIF6	2/13DTT	MVOLT	BDP / F6LD3
Series	Lamps	Voltage	Options
LIF6	2/13DTT	MVOLT	

Shipped installed in fixture

GMF Single slow-blow fuse
PHC Poke-home wire connectors – factory installed push-in terminals
AT Aluminum tape seals housing to minimize air flow through rough-in. Complies with WSEC and certified per ASTM E283 requirements
BDP Ballast disconnect plug meets codes that require in-fixture disconnect
RIF1 Radio interference filter
WLP 35K lamp (shipped separately)

Accessories:

Order as separate catalog number.
LSMC T-bar mounting clips, set of four

NOTES:
See trim summary on reverse side for maximum wattages.

Description / Catalog number — Maximum wattage / Sheet number

General/Task

Open Narrow Flange
F6O2 White
F6O2A Clear Diffuse
F6O2G Gold Diffuse
F6O2AZ Clear Specular[3]
F6O2GZ Gold Specular[3]

13 DTT
IC ROPN-120

Cone Narrow Flange Diffuse Upper Reflector
F6C3BLZ Black Specular

13 DTT
IC ROPN-145

Baffle Narrow Flange Diffuse Upper Reflector
F6B3 Black
F6B3W White

13 DTT
IC RBAF-130

Accent/Wallwash

Wallwash Narrow Flange
F6W1 White
F6W1A Clear Diffuse
F6W1G Gold Diffuse
F6W1AZ Clear Specular[3]
F6W1GZ Gold Specular[3]

13 DTT
IC RWLL-120

Wallwash Eyelid Narrow Flange
F6WE1 White

13 DTT
IC RWLL-125

Baffled Wallwash Eyelid Narrow Flange
F6WE2 Black
F6WE2W White

13 DTT
IC RWLL-125

Lens/Wet Location

Glass Lens Narrow Flange
F6LD3 Drop Opal White Splay
F6LDB3 Drop Opal Black Baffle
F6LF3 Flat White White Splay
F6LFB3 Flat White Black Baffle
F6L4 Fresnel White Splay
F6LB4 Fresnel Black Baffle

13 DTT
IC RLNS-130

Tempered Glass Lens Narrow Flange
F6LF73 White splay, tempered prismatic lens
F6LFB73 Black baffle, temered prismatic lens

13 DTT
IC RLNS-130

** For plastic flange add suffix PF*

NOTES:
1 Maximum wattage listed. Lower wattage lamps may be used.
2 Lens trims are wet location listed. All others are damp location.
3 Flange matches reflector.

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Lithonia Lighting
Recessed Downlighting
One Lithonia Way, Conyers, GA 30012
Phone: 800-315-4935 Fax: 770-918-1209
www.lithonia.com

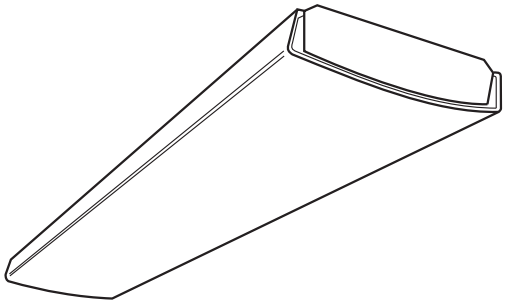
LITHONIA LIGHTING®

Catalog Number	LB 3 32 MVOLT 1/3	
Notes	JEFFERSON SANDING SHED	Type H

FEATURES & SPECIFICATIONS

Low-Profile Wraparound

LB 3



T5 and T8
3 lamps
Wide body
4' or 8' length

INTENDED USE

For applications that require the clean appearance of a low-profile, brightness-controlled wraparound. Provides broad distribution of light for offices, schools and corridors. **Certain airborne contaminants can diminish integrity of acrylic.** Click here for Acrylic Environmental Compatibility table for suitable uses.

ATTRIBUTES

Curved prismatic diffuser with linear side prisms minimize lamp image and provides high angle brightness control. Luminous end plates soften appearance for improved aesthetics.

CONSTRUCTION

Metal parts are die formed from code-gauge steel. Prismatic diffuser is 100% acrylic with sonically welded luminous ends. Continuous side flanges on fixture body provide light trap and continuous diffuser support to prevent accidental opening and simplify maintenance.

FINISH

Five stage iron-phosphate pretreatment assure superior paint adhesion and rust resistance.

Painted parts finished with high-gloss, high-reflectivity baked white polyester enamel (low VOC).

ELECTRICAL SYSTEM

Thermally-protected, resetting, Class P, HPF, non-PCB, UL Listed, CSA Certified ballast is standard. Luminaire is suitable for damp locations. AWM, TFN or THHN wire used throughout, rated for required temperatures.

UL/CSA listed ballast disconnect w/strain relief and leads provided standard.

LISTING

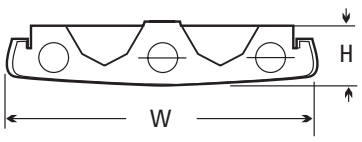
UL Listed (standard). Optional: Canada CSA or C-UL. Mexico NOM.

WARRANTY

Guaranteed for one year against mechanical defects in manufacture.

Specifications

T8 Length: 24 (61.00) 48 (122.00) or 96 (243.90)
T5 Length: 46.5 (118.1) 22.5 (57.2)
Width: 15-3/8 (39.05)
Depth: 3 (7.62)



All dimensions are inches (centimeters) .
Specifications subject to change without notice.

ORDERING INFORMATION

For shortest lead times, configure product using **standard options (shown in bold).**

Example: LB 3 32 MVOLT GEB10IS 1/3 GEB10IS

LB	3	32	MVOLT	1/3 GEB10IS
Series	Number of lamps	Lamp type	Voltage	Options
LB 3 lamps, 15-3/8" wide	**3**	**32 32W T8 (48")**	120	**1/3 One, three-lamp ballast**
For tandem, double-length unit, add prefix T. Example: TLB	Not included	28 28W T5 (46.5")[2]	277	**GEB10IS Electronic ballast, ≤10% THD, instant start**
			347	GEB10PS Electronic ballast, ≤10% THD, program start
			MVOLT	EL Emergency battery pack (nominal 300 lumens See Life Safety Section).
			Others available	GLR Internal fast-blow fuse.[1]
				GMF Internal slow-blow fuse.[1]
				LSC Lens safety clips (2 per fixture).
				LP_ Lamped; specify lamp type and color
				CSA Listed and labeled to comply with Canadian Standards.
				SSR Specular silver interior finish (95% reflective).

NOTES:
1 Must specify voltage.
2 All T5 lamp types use GEB10PS ballast only.

Accessories

Order as separate item
SQ Swivel-stem hanger (specify in 2" increments).
1B Ceiling spacer (adjusts from 1-1/2" to 2-1/2" from ceiling).

LB 3 Low-Profile Wraparound, Wide Body

MOUNTING DATA

For unit or row installation, surface or stem mounting. Stem mounting not available on TLB units.

Individual installation — Four single-stem hangers required.

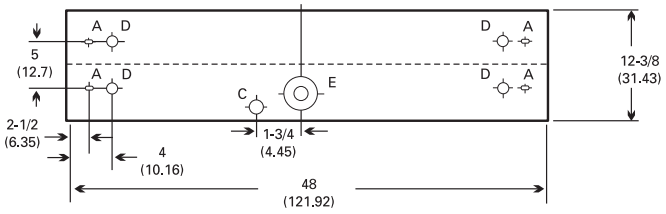
Row installation — Two hangers per fixture plus two per row required.

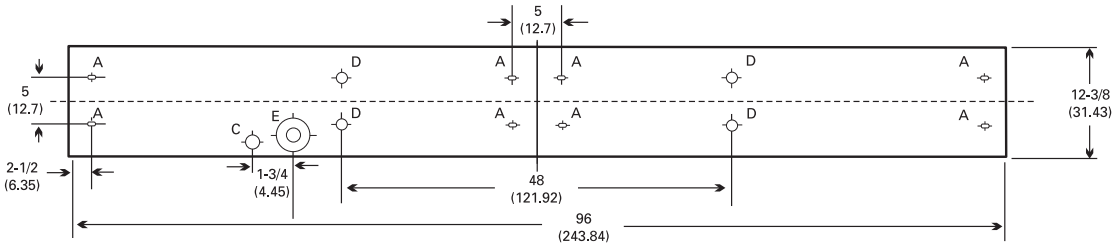
See ACCESSORIES below for hanging devices.

DIMENSIONS

Inches (centimeters). Subject to change without notice.

A = 1/4 x 1/2 (.635 x 1.27) hole
C = 7/8 (2.22) Dia.K.O.
D = 11/16 (1.74) Dia. K.O.
E = 2 (5.08) Dia. K.O. and 7/8 (2.22) Dia. K.O.





PHOTOMETRICS

Calculated using the zonal cavity method in accordance with IESNA LM41 procedure. Floor reflectances are 20%. Lamp configurations shown are typical. Full photometric data on these and other configurations available upon request.

LB 3 32

Report LTL 5638 – Lumens per lamp = 2900

S/MH (along) 1.2 (across) 1.3

Coefficient of Utilization

Ceiling	80%			70%			50%			0%
Wall	70%	50%	30%	70%	50%	30%	50%	30%	10%	0%
0	87	87	87	84	84	84	79	79	79	67
1	80	77	74	77	74	71	70	67	65	57
2	74	68	63	71	66	62	62	59	56	49
3	68	61	55	65	59	54	56	51	48	43
4	63	54	48	60	53	47	50	45	42	37
5	57	49	42	55	47	41	45	40	36	32
6	53	44	37	51	43	37	41	35	32	28
7	49	39	33	47	38	33	37	32	28	25
8	45	35	29	44	35	29	33	28	24	22
9	42	32	26	40	31	25	30	25	21	19
10	39	29	23	37	28	23	27	22	19	16

Zonal Lumens Summary

Zone	Lumens	%Lamp	%Fixture
0-30	1786	20.5	27.5
0-40	2935	33.7	45.1
0-60	4808	55.3	73.9
0-90	5835	67.1	89.7
90-180	668	7.7	10.3
0-180	6503	74.8	100.0

Energy (Calculated in accordance with NEMA standard LE-5)

LER.FW	ANNUAL ENERGY COST*	LAMP DESCRIPTION	LAMP LUMENS	BALLAST FACTOR	WATTS
65	**$3.69**	(3) 32W T8	2850	.88	87

*Calculated in accordance with NEMA Standard LE-5.

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Lithonia Lighting
Fluorescent
One Lithonia Way, Conyers, GA 30012-3957
Phone: 800-858-7763 Fax: 770-929-8789
www.lithonia.com

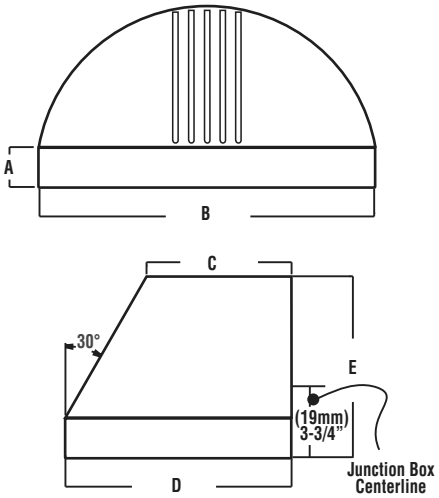
16512

Exterior Luminaires

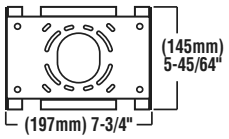
CHALLENGER® WALL SCONCE (Various reflectors are protected by U.S. Patent No. 6,464,378.)

Flat-lensed fixtures meet IESNA full cutoff classification

DIMENSIONS



	A	B	C	D	E
Small	(48mm) 1-7/8"	(448mm) 17-5/8"	(144mm) 5-21/32"	(244mm) 9-5/8"	(222mm) 8-3/4"
Medium	(60mm) 2-3/8"	(508mm) 20"	(219mm) 8-5/8"	(341mm) 13-7/16"	(273mm) 10-3/4"



Universal Mounting Plate

SHIPPING WEIGHTS - Challenger Wall Sconce

Catalog Number	Est. Weight (kg/lbs.)	Length (mm/in.)	Width (mm/in.)	Height (mm/in.)
CHWS-HID	10 / 22	616 / 24.25	394 / 15.5	343 / 13.5
CHWM-HID	15 / 32	616 / 24.25	394 / 15.5	419 / 16.5
CHWS-CFL	8 / 17	616 / 24.25	394 / 15.5	343 / 13.5
CHWM-CFL	11 / 24	616 / 24.25	394 / 15.5	419 / 16.5

c UL us LISTED

wet location (Downlight only)

damp location (Uplight - covered locations only)

HOUSING - The aerodynamic aluminum housing is a rectangular shape. All mounting hardware is stainless steel or electro-zinc plated steel.

WALL MOUNT - A galvanized-steel universal wall mounting plate easily mounts directly to a 4" octagonal or square junction box. An EPDM gasket is supplied to be installed between the mounting plate and junction box, sealing the junction box from entrance of water. The galvanized-steel universal plate allows the fixture to securely attach to the mounting plate using a unique clamping design which is locked into place with two hex-head screws. The universal plate permits the fixture to be mounted in the uplighting position (listed for damp locations) or downlighting position (listed for wet locations).

DOOR FRAME - The aluminum door frame with two stainless steel captive fasteners allows easy access into the fixture. A one piece extruded silicone gasket seals the door frame against the housing. The door swings open and is held in place by a retainer.

LENS/GASKET - A flat clear tempered glass lens, which is sealed to the door frame with EPDM gasketing, is standard. An optional polycarbonate lens is available on most Compact Fluorescent fixtures.

SOCKETS - HID lampholders are glazed porcelain, medium base for the Small fixture and mogul base for the Medium fixture, 4KV pulse rated. The Compact Fluorescent fixtures feature a one-piece thermoplastic socket.

LIGHT SOURCES - The fixture is designed to operate with horizontal Pulse-Start Metal Halide, Pulse-Start Metal Halide Reduced, Ceramic Metal Halide, Metal Halide, High Pressure Sodium, and single, double or triple Compact Fluorescent lamps. Lamps supplied as standard – HID (clear, shipped installed), and Compact Fluorescent (coated, 4100K).

BALLASTS/ELECTRICAL COMPONENTS - Electrical components are factory-mounted in housing and prewired with voltage specific leads which extend out the back of the unit through a rubber grommet. This grommet prevents the entry of insects, dust, and moisture into the fixture. The need to open the fixture to make wiring connections is eliminated, thus making installation quick and easy. UL listed HID components with high-power factor ballasts rated for -20° F starting. Compact Fluorescent ballasts are Electronic Universal Voltage (120-277V, 50/60Hz) or 347V (60Hz), 0°F starting. Compact Fluorescent fixtures with UE (Universal Electronic) voltage are available with an optional dimming ballast for multiple types of controls such as building lighting controls and occupancy sensors. Available battery back-up of BB (32° starting temperature) and CWBB (0° starting temperature) are 120 or 277 voltage specific for U.S. applications for 26 watt through 70 watt lamps. Consult factory for available wattages and voltages for use in Canada.

EMERGENCY OPERATION - A variety of integral emergency options are available to comply with Life Safety Codes which require emergency lighting along the path of egress on the building's exterior, so building occupants can exit safely. Integral Emergency Battery Back-up options are available on Compact Fluorescent units. Emergency Quartz options are offered on HID units. Options for one or two 12 volt separate circuit(s), for use with up to 35 watt Halogen lamp(s) are available on both Compact Fluorescent and HID units.

REFLECTORS/DISTRIBUTION PATTERNS - Forward Throw (FTM, FT) and Type III (3) reflectors are available on small and medium. Wall Wash (WW) reflectors are also available on small. All are high performance, full cut-off distribution as defined by the IESNA (downlight position only). Photometric data is tested in accordance with IESNA guidelines.

FINISHES - Each fixture is finished with LSI's DuraGrip® polyester-powder finishing process. The DuraGrip finish withstands extreme weather changes without cracking or peeling and is guaranteed for five full years. Standard colors include bronze, black, platinum plus, buff, white, satin verde green, metallic silver, and graphite.

PHOTOMETRICS - Please visit our web site at **www.lsi-industries.com** for detailed photometric data.

CASCADE LIGHTING REPRESENTATIVES
503.242.2522

City of Jefferson - Public Works Building
TYPE: A
CHWS-FT-70MH-F-120-BRZ-PCI120-LP

CHALLENGER® WALL SCONCE

LUMINAIRE ORDERING INFORMATION

TYPICAL ORDER EXAMPLE: **CHWM FT 400 PSMHR F 120 BRZ SQT**

Luminaire Prefix	Distribution	Lamp Wattage	Light Source	Lens	Line Voltage	Luminaire Finish	Options
CHWS (Small)	3 - Type III FT - Forward Throw WW - Wall Wash	50 70 100 150	CMH - Ceramic Metal Halide 150 Watt[1] MH - Metal Halide 50, 70, 100[2], 150[1] Watt HPS - High Pressure Sodium 50[3], 70, 100, 150 Watt	F- Flat Clear Tempered Glass	120 208 240 277 347	BRZ – Bronze BLK – Black PLP – Platinum Plus BUF – Buff WHT – White SVG - Satin Verde Green GPT - Graphite MSV - Metallic Silver	PCI120 - Button-Type Photocell PCI208 - Button-Type Photocell PCI240 - Button-Type Photocell PCI277 - Button Type-Photocell PCI347 - Button Type-Photocell TP - Tamper Proof[7] PMA - Pole Mount Adaptor for use with square poles (for S or D180 mounting configurations only) Not compatible with EM1, EM2, EQ or EQ2 options PMAR - Pole Mount Adaptor for use with round poles (for S or D180 mounting configurations only) Not compatible with EM1, EM2, EQ or EQ2 options DIM - CFL Control Voltage Dimming Ballast[8] C - Coated MH or PSMH Lamp except 250 PSMH SQT - Standby Quartz (Time Delay)[9] SQN - Standby Quartz (Non-Time Delay)[9] EQ - Emergency Quartz (separate 120V circuit - HID only)[9] EQ2 - Two Emergency Quartz (2 separate 120V circuits - HID only)[10] BB - CFL Battery Back-up[11] CWBB - Cold Weather Battery Back-up[11] EM1 - One Emergency 12V Circuit Provision with 35 Watt Halogen Lamp[12] EM1LL - One Emergency 12V Circuit Provision - Less Halogen Lamp[12] EM2 - Two Emergency 12V Circuit Provisions with (2) 35 Watt Halogen Lamps[12] EM2LL - Two Emergency 12V Circuit Provisions - Less Halogen Lamps[12] LL - Less Lamp
	FTM - Forward Throw Medium	26 32 42	CFL - Compact Fluorescent Single 26, 32, 42 Watt CFL2 - Compact Fluorescent Double 26, 32, 42 Watt	F- Flat Clear Tempered Glass FPC - Flat Clear Polycarbonate[4]	UE - Universal Electronic (120-277V 50/60Hz) 347[6]		
	WW - Wall Wash		CFL - Compact Fluorescent Single 26, 32, 42 Watt				
CHWM (Medium)	3 - Type III FT - Forward Throw	250 320 400	PSMH - Pulse Start Metal Halide 250, 320 Watt PSMHR - Pulse Start Metal Halide Reduced 400 Watt HPS - High Pressure Sodium 250, 400 Watt	F- Flat Clear Tempered Glass	120 208 240 277 347 480		
		26 32 42 57 70	CFL - Compact Fluorescent Single 57, 70 Watt CFL2 - Compact Fluorescent Double 57, 70 Watt CFL3 - Compact Fluorescent Triple 26, 32, 42 Watt	F- Flat Clear Tempered Glass FPC - Flat Clear Polycarbonate[4,5]	UE - Universal Electronic (120-277V 50/60Hz) 347[6]		

Consult Factory for International Voltages and Light Sources

LP = lamp included

FOOTNOTES:

1- 150 MH must be used for downlight only.

2- Supplied with a HX-HPF transformer as standard. Also available with a 120/277 volt CWA transformer. Consult factory.

3- 50 Watt HPS is not available in TT or 347V.

4- FPC lens is not available with EM options.

5- If a polycarbonate lens is required on an Uplight Medium fixture in 70 CFL2 or 42 CFL3, the glass lens with Polycarbonate Shield (CHWM PLS) accessory must be ordered.

6- 347V CFL is not available with dimming ballast (DIM) option. Consult factory for battery back-up (BB) options.

7- Tamper-proof Screwdriver must be ordered separately. (See Accessory Ordering Information)

8- CFL Dimming Control by others.

9- HID lamp wattages 50 and 70 are supplied with a 50 watt, 120V quartz lamp. HID lamp wattages 100 through 250 are supplied with a 100 watt, 120V quartz lamp. HID lamp wattages of 320 & 400 are supplied with a 250 watt, 120V quartz lamp. EQ option is not compatible with PMA or PMAR options.

10- Available on 100 watt minimum HID fixtures. HID lamp wattages 100 through 175 are supplied with two 50 watt, 120V quartz lamps. 250 through 400 watt HID fixtures are supplied with two 100 watt, 120V quartz lamps. EQ2 option is not compatible with PMA or PMAR options.

11- Battery Back-up available on single, double and triple 120 or 277 voltage specific units for U.S. applications. Please change Line Voltage of UE to 120 or 277 when ordering this option. On double and triple units, one lamp will be energized by Battery Back-up (BB) option. Consult factory for specific Means of Egress job application compliance.

12- Utilizes GY6.35 socket(s). 12 volt separate circuit(s) required. Not compatible with PMA or PMAR option or FPC lens.

ACCESSORY ORDERING INFORMATION (Accessories are field installed)

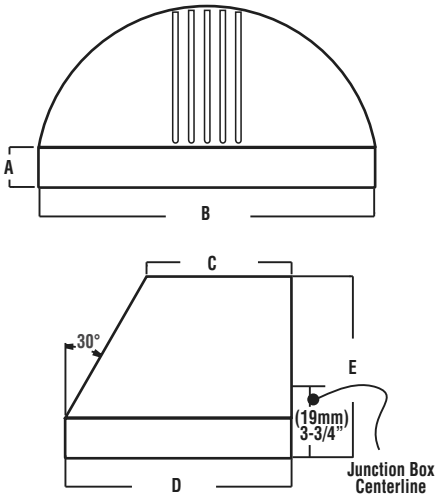
Description	Order Number	Description	Order Number
FK120 - Single Fusing	FK120+	CHWS PLS - Polycarbonate Shield for Small	172786
FK277 - Single Fusing	FK277+	CHWM PLS - Polycarbonate Shield for Medium	172787
DFK208, 240 - Double Fusing	DFK208, 240+	SW BLK - Surface Wiring Box	173156BLK+++
DFK480 - Double Fusing	DFK480++	SCD - Tamper-proof Screwdriver	36449
FK347 - Single Fusing	FK347+		

+ Available on HID fixtures only. Fusing to be installed in a compatible junction box supplied by contractor.
++ Available on HID Medium fixture only. Fusing to be installed in a compatible junction box supplied by contractor.
+++SW BLK not compatible with PMA or PMAR option.

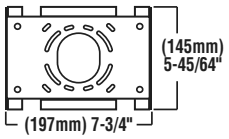
CHALLENGER® WALL SCONCE (Various reflectors are protected by U.S. Patent No. 6,464,378.)

Flat-lensed fixtures meet IESNA full cutoff classification

DIMENSIONS



	A	B	C	D	E
Small	(48mm) 1-7/8"	(448mm) 17-5/8"	(144mm) 5-21/32"	(244mm) 9-5/8"	(222mm) 8-3/4"
Medium	(60mm) 2-3/8"	(508mm) 20"	(219mm) 8-5/8"	(341mm) 13-7/16"	(273mm) 10-3/4"



Universal Mounting Plate

SHIPPING WEIGHTS - Challenger Wall Sconce

Catalog Number	Est. Weight (kg/lbs.)	Length (mm/in.)	Width (mm/in.)	Height (mm/in.)
CHWS-HID	10 / 22	616 / 24.25	394 / 15.5	343 / 13.5
CHWM-HID	15 / 32	616 / 24.25	394 / 15.5	419 / 16.5
CHWS-CFL	8 / 17	616 / 24.25	394 / 15.5	343 / 13.5
CHWM-CFL	11 / 24	616 / 24.25	394 / 15.5	419 / 16.5

c UL us LISTED

wet location (Downlight only)

damp location (Uplight - covered locations only)

HOUSING - The aerodynamic aluminum housing is a rectangular shape. All mounting hardware is stainless steel or electro-zinc plated steel.

WALL MOUNT - A galvanized-steel universal wall mounting plate easily mounts directly to a 4" octagonal or square junction box. An EPDM gasket is supplied to be installed between the mounting plate and junction box, sealing the junction box from entrance of water. The galvanized-steel universal plate allows the fixture to securely attach to the mounting plate using a unique clamping design which is locked into place with two hex-head screws. The universal plate permits the fixture to be mounted in the uplighting position (listed for damp locations) or downlighting position (listed for wet locations).

DOOR FRAME - The aluminum door frame with two stainless steel captive fasteners allows easy access into the fixture. A one piece extruded silicone gasket seals the door frame against the housing. The door swings open and is held in place by a retainer.

LENS/GASKET - A flat clear tempered glass lens, which is sealed to the door frame with EPDM gasketing, is standard. An optional polycarbonate lens is available on most Compact Fluorescent fixtures.

SOCKETS - HID lampholders are glazed porcelain, medium base for the Small fixture and mogul base for the Medium fixture, 4KV pulse rated. The Compact Fluorescent fixtures feature a one-piece thermoplastic socket.

LIGHT SOURCES - The fixture is designed to operate with horizontal Pulse-Start Metal Halide, Pulse-Start Metal Halide Reduced, Ceramic Metal Halide, Metal Halide, High Pressure Sodium, and single, double or triple Compact Fluorescent lamps. Lamps supplied as standard – HID (clear, shipped installed), and Compact Fluorescent (coated, 4100K).

BALLASTS/ELECTRICAL COMPONENTS - Electrical components are factory-mounted in housing and prewired with voltage specific leads which extend out the back of the unit through a rubber grommet. This grommet prevents the entry of insects, dust, and moisture into the fixture. The need to open the fixture to make wiring connections is eliminated, thus making installation quick and easy. UL listed HID components with high-power factor ballasts rated for -20° F starting. Compact Fluorescent ballasts are Electronic Universal Voltage (120-277V, 50/60Hz) or 347V (60Hz), 0°F starting. Compact Fluorescent fixtures with UE (Universal Electronic) voltage are available with an optional dimming ballast for multiple types of controls such as building lighting controls and occupancy sensors. Available battery back-up of BB (32° starting temperature) and CWBB (0° starting temperature) are 120 or 277 voltage specific for U.S. applications for 26 watt through 70 watt lamps. Consult factory for available wattages and voltages for use in Canada.

EMERGENCY OPERATION - A variety of integral emergency options are available to comply with Life Safety Codes which require emergency lighting along the path of egress on the building's exterior, so building occupants can exit safely. Integral Emergency Battery Back-up options are available on Compact Fluorescent units. Emergency Quartz options are offered on HID units. Options for one or two 12 volt separate circuit(s), for use with up to 35 watt Halogen lamp(s) are available on both Compact Fluorescent and HID units.

REFLECTORS/DISTRIBUTION PATTERNS - Forward Throw (FTM, FT) and Type III (3) reflectors are available on small and medium. Wall Wash (WW) reflectors are also available on small. All are high performance, full cut-off distribution as defined by the IESNA (downlight position only). Photometric data is tested in accordance with IESNA guidelines.

FINISHES - Each fixture is finished with LSI's DuraGrip® polyester-powder finishing process. The DuraGrip finish withstands extreme weather changes without cracking or peeling and is guaranteed for five full years. Standard colors include bronze, black, platinum plus, buff, white, satin verde green, metallic silver, and graphite.

PHOTOMETRICS - Please visit our web site at **www.lsi-industries.com** for detailed photometric data.

CHALLENGER® WALL SCONCE

LUMINAIRE ORDERING INFORMATION

TYPICAL ORDER EXAMPLE: **CHWM FT 400 PSMHR F 120 BRZ SQT**

Luminaire Prefix	Distribution	Lamp Wattage	Light Source	Lens	Line Voltage	Luminaire Finish	Options
CHWS (Small)	3 - Type III FT - Forward Throw WW - Wall Wash	50 70 100 150 175	CMH - Ceramic Metal Halide 150 Watt[1] MH - Metal Halide 50, 70, 100[2], 150[1] Watt HPS - High Pressure Sodium 50[3], 70, 100, 150 Watt	F- Flat Clear Tempered Glass	120 208 240 277 347	BRZ – Bronze BLK – Black PLP – Platinum Plus BUF – Buff WHT – White SVG - Satin Verde Green GPT - Graphite MSV - Metallic Silver	PCI120 - Button-Type Photocell PCI208 - Button-Type Photocell PCI240 - Button-Type Photocell PCI277 - Button Type-Photocell PCI347 - Button Type-Photocell TP - Tamper Proof [7] PMA - Pole Mount Adaptor for use with square poles (for S or D180 mounting configurations only) Not compatible with EM1, EM2, EQ or EQ2 options PMAR - Pole Mount Adaptor for use with round poles (for S or D180 mounting configurations only) Not compatible with EM1, EM2, EQ or EQ2 options DIM - CFL Control Voltage Dimming Ballast [8] C - Coated MH or PSMH Lamp except 250 PSMH SQT - Standby Quartz (Time Delay) [9] SQN - Standby Quartz (Non-Time Delay) [9] EQ - Emergency Quartz (separate 120V circuit - HID only) [9] EQ2 - Two Emergency Quartz (2 separate 120V circuits - HID only) [10] BB - CFL Battery Back-up [11] CWBB - Cold Weather Battery Back-up[11] EM1 - One Emergency 12V Circuit Provision with 35 Watt Halogen Lamp [12] EM1LL - One Emergency 12V Circuit Provision - Less Halogen Lamp [12] EM2 - Two Emergency 12V Circuit Provisions with (2) 35 Watt Halogen Lamps [12] EM2LL - Two Emergency 12V Circuit Provisions - Less Halogen Lamps [12] LL - Less Lamp
	FTM - Forward Throw Medium	26 32 42	CFL - Compact Fluorescent Single 26, 32, 42 Watt CFL2 - Compact Fluorescent Double 26, 32, 42 Watt	F- Flat Clear Tempered Glass FPC - Flat Clear Polycarbonate [4]	UE - Universal Electronic (120-277V 50/60Hz) 347 [6]		
	WW - Wall Wash		CFL - Compact Fluorescent Single 26, 32, 42 Watt				
CHWM (Medium)	3 - Type III FT - Forward Throw	250 320 400	PSMH - Pulse Start Metal Halide 250, 320 Watt PSMHR - Pulse Start Metal Halide Reduced 400 Watt HPS - High Pressure Sodium 250, 400 Watt	F- Flat Clear Tempered Glass	120 208 240 277 347 480		
		26 32 42 57 70	CFL - Compact Fluorescent Single 57, 70 Watt CFL2 - Compact Fluorescent Double 57, 70 Watt CFL3 - Compact Fluorescent Triple 26, 32, 42 Watt	F- Flat Clear Tempered Glass FPC - Flat Clear Polycarbonate [4,5]	UE - Universal Electronic (120-277V 50/60Hz) 347 [6]		

Consult Factory for International Voltages and Light Sources

LP = lamp included

FOOTNOTES:

1- 150 MH must be used for downlight only.

2- Supplied with a HX-HPF transformer as standard. Also available with a 120/277 volt CWA transformer. Consult factory.

3- 50 Watt HPS is not available in TT or 347V.

4- FPC lens is not available with EM options.

5- If a polycarbonate lens is required on an Uplight Medium fixture in 70 CFL2 or 42 CFL3, the glass lens with Polycarbonate Shield (CHWM PLS) accessory must be ordered.

6- 347V CFL is not available with dimming ballast (DIM) option. Consult factory for battery back-up (BB) options.

7- Tamper-proof Screwdriver must be ordered separately. (See Accessory Ordering Information)

8- CFL Dimming Control by others.

9- HID lamp wattages 50 and 70 are supplied with a 50 watt, 120V quartz lamp. HID lamp wattages 100 through 250 are supplied with a 100 watt, 120V quartz lamp. HID lamp wattages of 320 & 400 are supplied with a 250 watt, 120V quartz lamp. EQ option is not compatible with PMA or PMAR options.

10- Available on 100 watt minimum HID fixtures. HID lamp wattages 100 through 175 are supplied with two 50 watt, 120V quartz lamps. 250 through 400 watt HID fixtures are supplied with two 100 watt, 120V quartz lamps. EQ2 option is not compatible with PMA or PMAR options.

11- Battery Back-up available on single, double and triple 120 or 277 voltage specific units for U.S. applications. Please change Line Voltage of UE to 120 or 277 when ordering this option. On double and triple units, one lamp will be energized by Battery Back-up (BB) option. Consult factory for specific Means of Egress job application compliance.

12- Utilizes GY6.35 socket(s). 12 volt separate circuit(s) required. Not compatible with PMA or PMAR option or FPC lens.

ACCESSORY ORDERING INFORMATION (Accessories are field installed)

Description	Order Number	Description	Order Number
FK120 - Single Fusing	FK120+	CHWS PLS - Polycarbonate Shield for Small	172786
FK277 - Single Fusing	FK277+	CHWM PLS - Polycarbonate Shield for Medium	172787
DFK208, 240 - Double Fusing	DFK208, 240+	SW BLK - Surface Wiring Box	173156BLK+++
DFK480 - Double Fusing	DFK480++	SCD - Tamper-proof Screwdriver	36449
FK347 - Single Fusing	FK347+		

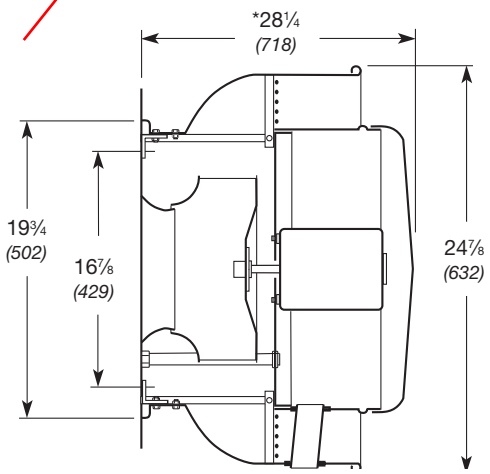
+ Available on HID fixtures only. Fusing to be installed in a compatible junction box supplied by contractor.
++ Available on HID Medium fixture only. Fusing to be installed in a compatible junction box supplied by contractor.
+++SW BLK not compatible with PMA or PMAR option.

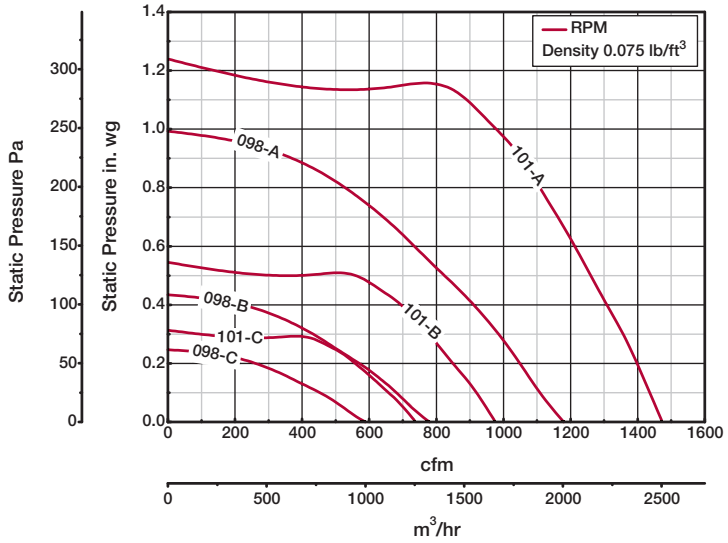
Supplement 1

Ventilation Equipment

Sidewall - Direct Drive
CW-098 and CW-101

Model: CW-098-A
Designation: EF-801





CW

Damper Size = 12 x 12 *(305 x 305)*
Damper Frame Size = 14 x 14 *(356 x 356)*
Wall Opening = 12½ x 12½ *(318 x 318)*
Windband Thickness = 0.051 *(1.3)*
Motor Cover Thickness = 0.040 *(1.0)*
^Approximate Unit Weight = 53 lb *(24 kg)*

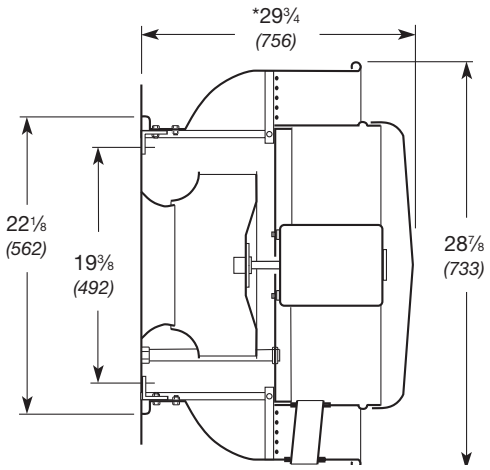
All dimensions in inches (millimeters). *May be greater depending on motor. ^Weight shown is largest cataloged Open Drip-Proof motor. For specification information and image of model, please see page 85.

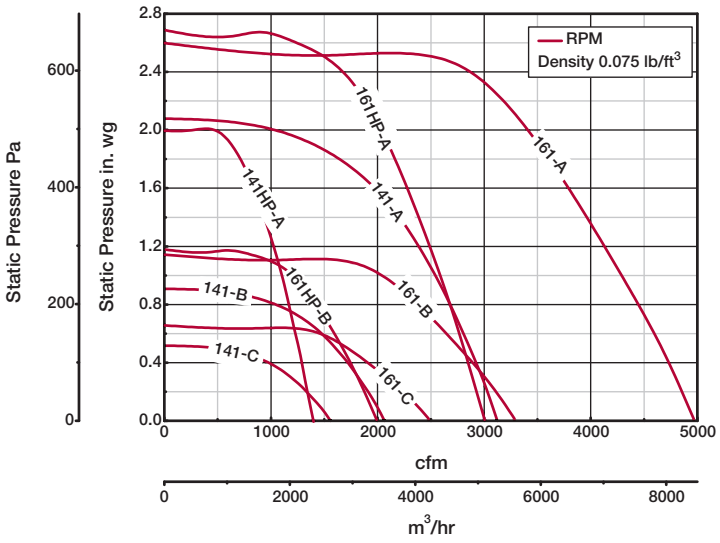
Model Size	Motor HP	Fan RPM		CFM / Static Pressure in Inches wg									
				0	0.1	0.125	0.25	0.3	0.375	0.5	0.625	0.75	1
CW-098-C	1/8	860	CFM	588	453	409			MAXIMUM MOTOR FRAME SIZE = 56				
			BHP	0.02	0.02	0.02							
			Sones	8.4	8.5	8.7							
CW-098-B	1/6	1140	CFM	780	682	656	502	431	294				
			BHP	0.05	0.05	0.06	0.06	0.06	0.06				
			Sones	9.1	8.7	8.7	8.3	8.1	7.9				
CW-098-A	1/4	1725	CFM	1180	1109	1094	1017	984	929	824	712	586	
			BHP	0.18	0.18	0.18	0.18	0.19	0.20	0.20	0.20	0.20	
			Sones	13.8	13.5	13.4	13.0	12.9	12.7	12.2	12.1	12.3	
CW-101-C	1/8	860	CFM	732	649	625	481						
			BHP	0.03	0.03	0.04	0.04						
			Sones	4.6	8.5	11.7	111						
CW-101-B	1/6	1140	CFM	970	913	897	806	768	707				
			BHP	0.07	0.08	0.08	0.08	0.09	0.09				
			Sones	7.2	7.0	7.0	6.5	6.2	6.0				
CW-101-A	1/4	1725	CFM	1468	1431	1422	1373	1350	1315	1255	1195	1129	970
			BHP	0.24	0.25	0.26	0.27	0.27	0.28	0.29	0.29	0.29	0.29
			Sones	13.3	12.9	12.9	12.5	12.3	12.0	11.7	11.3	10.8	9.7

Performance certified is for installation type A: Free inlet, Free outlet. Performance ratings do not include the effects of appurtenances (accessories). The sound ratings shown are loudness values in fan sones at 5 ft. (1.5 m) in a hemispherical free field calculated per AMCA Standard 301. Values shown are for installation type A: Free inlet hemispherical sone levels.

Sidewall - Direct Drive
CW-141, CW-141HP, CW-161 and CW-161HP

Model: **CW-161-A**
Designation: **EF-802**





CW
Damper Size = 15 x 15 *(381 x 381)*
Damper Frame Size = 17 x 17 *(432 x 432)*
Wall Opening = 15½ x 15½ *(394 x 394)*
Windband Thickness = 0.051 *(1.3)*
Motor Cover Thickness = 0.040 *(1.0)*
^Approximate Unit Weight = 90 lb *(41 kg)*

All dimensions in inches (millimeters). *May be greater depending on motor. ^Weight shown is largest cataloged Open Drip-Proof motor. For specification information and image of model, please see page 85.

Model Size	Motor HP	Fan RPM		CFM / Static Pressure in Inches wg									
				0	0.25	0.5	0.75	1	1.25	1.5	1.75	2	2.25
CW-141-C	1/8	860	CFM	1558	1264				MAXIMUM MOTOR FRAME SIZE = 145T				
			BHP	0.11	0.12								
			Sones	7.3	7.1								
CW-141-B	1/4	1140	CFM	2065	1864	1605	1167						
			BHP	0.25	0.27	0.29	0.27						
			Sones	11.3	11.0	10.3	10.0						
CW-141-A	1	1725	CFM	3125	3005	2865	2711	2539	2339	2085	1704		
			BHP	0.87	0.90	0.94	0.97	0.99	1.00	0.98	0.91		
			Sones	26	22	24	15.1	13.4	14.3	13.8	13.8		
CW-141HP-A	1/2	1725	CFM	1394	1324	1256	1178	1098	999	879	747		
			BHP	0.34	0.36	0.38	0.40	0.42	0.43	0.43	0.42		
			Sones	16.6	16.3	16.1	15.4	15.0	14.9	14.7	15.7		
CW-161-C	1/4	860	CFM	2472	2126	1680							
			BHP	0.22	0.25	0.24							
			Sones	10.7	9.9	9.5							
CW-161-B	1/2	1140	CFM	3277	3035	2745	2421	1983					
			BHP	0.51	0.57	0.58	0.57	0.55					
			Sones	15.1	14.8	14.1	13.5	13.2					
CW-161-A	2	1725	CFM	4959	4806	4646	4463	4269	4070	3855	3631	3381	3057
			BHP	1.77	1.88	1.97	1.98	2.00	2.01	1.99	1.97	1.96	1.92
			Sones	30	29	28	27	27	27	26	26	25	25
CW-161HP-B	1/3	1140	CFM	1976	1822	1645	1444	1175					
			BHP	0.26	0.28	0.31	0.32	0.32					
			Sones	13.5	12.8	12.5	11.9	11.1					
CW-161HP-A	1½	1725	CFM	2990	2888	2787	2680	2560	2439	2310	2167	2003	1810
			BHP	0.89	0.93	0.97	1.01	1.04	1.07	1.10	1.11	1.12	1.11
			Sones	24	23	22	22	21	20	20	19.6	18.3	16.6

Performance certified is for installation type A: Free inlet, Free outlet. Performance ratings do not include the effects of appurtenances (accessories). The sound ratings shown are loudness values in fan sones at 5 ft. (1.5 m) in a hemispherical free field calculated per AMCA Standard 301. Values shown are for installation type A: Free inlet hemispherical sone levels.

GREENHECK
Building Value in Air.

PN 457691
Models CW/CWB
Centrifugal Sidewall Exhaust Fans

Installation, Operation and Maintenance Manual

Please read and save these instructions for future reference. Read carefully before attempting to assemble, install, operate or maintain the product described. Protect yourself and others by observing all safety information. Failure to comply with instructions could result in personal injury and/or property damage!

Model CW Direct Drive

Model CW is a direct drive centrifugal sidewall exhaust fan. These fans are specifically designed for wall mounted application. Performance capabilities range up to 6,400 cfm *(10,874 m³/hr)* and up to 3 in. wg *(747 Pa)* of static pressure. The maximum continuous operating temperature for fan sizes 098-200 is 400°F (*204°C*) and for fan sizes 060-095 is 160°F (*71°C*). CW fans are available in fourteen sizes with nominal wheel diameter ranging from 9 to 20 inches (*229 mm to 508 mm*) (060 - 200 unit sizes). Each fan shall bear a permanently affixed manufacturer's engraved metal nameplate containing the model number and individual serial number.

Model CWB Belt Drive

Model CWB is a belt drive centrifugal sidewall exhaust fan. These fans are specifically designed for wall mounted application. Performance capabilities range up to 12,500 cfm *(21,200 m³/hr)* and up to 2.75 in. wg *(685 Pa)* of static pressure. The maximum continuous operating temperature is 400°F (*204.4°C*). CWB fans are available in nineteen sizes with nominal wheel diameter ranging from 9 to 30 inches (*229 to 762 mm*) (098 - 300 unit sizes). Each fan shall bear a permanently affixed manufacturer's engraved metal nameplate containing the model number and individual serial number.

General Safety Information

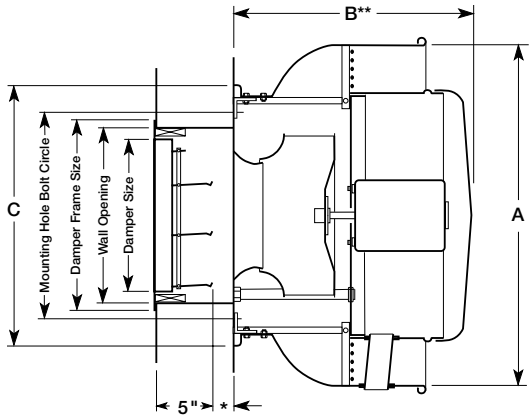
Only qualified personnel should install this fan. Personnel should have a clear understanding of these instructions and should be aware of general safety precautions. Improper installation can result in electric shock, possible injury due to coming in contact with moving parts, as well as other potential hazards. Other considerations may be required if high winds or seismic activity are present. If more information is needed, contact a licensed professional engineer before moving forward.

DANGER
Always disconnect, lock and tag power source before installing or servicing. Failure to disconnect power source can result in fire, shock or serious injury.
CAUTION
When servicing the fan, motor may be hot enough to cause pain or injury. Allow motor to cool before servicing.
CAUTION
Precaution should be taken in explosive atmospheres.

1. Follow all local electrical and safety codes, as well as the National Electrical Code (NEC) and the National Fire Protection Agency (NFPA), where applicable. Follow the Canadian Electric Code (CEC) in Canada.
2. The rotation of the wheel is critical. It must be free to rotate without striking or rubbing any stationary objects.
3. Motor must be securely and adequately grounded.
4. Do not spin fan wheel faster than max cataloged fan RPM. Adjustments to fan speed significantly effects motor load. If the fan RPM is changed, the motor current should be checked to make sure it is not exceeding the motor nameplate amps.
5. Do not allow the power cable to kink or come in contact with oil, grease, hot surfaces, or chemicals. Replace cord immediately if damaged.
6. Verify that the power source is compatible with the equipment.
7. Never open access doors to a duct while the fan is running.

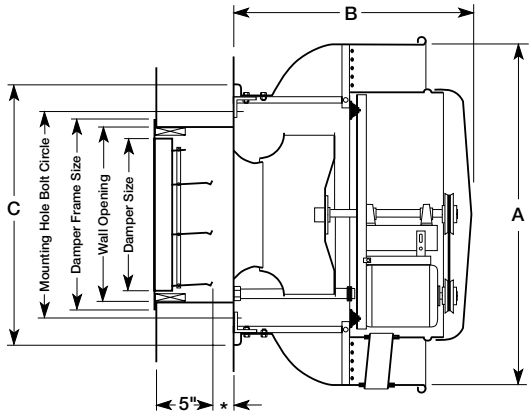
CW - Direct Drive Dimensions							
Model	A	B**	C	Wall Opening	Damper Size	Damper Frame Size	Mounting Bolt Circle
CW-060, 065, 070, 075	18⅜ *(467)*	13½ *(343)*	14¾ *(375)*	8½ *(216)*	8 *(203)*	10 *(254)*	11¾ *(298)*
CW-080, 085, 090	21 *(533)*	13⅜ *(340)*	17⅞ *(454)*	10½ *(267)*	10 *(254)*	12 *(305)*	15 *(381)*
CW-095	21 *(533)*	15¼ *(387)*	17⅞ *(454)*	10½ *(267)*	10 *(254)*	12 *(305)*	15 *(381)*
CW-098, 101, 121, 131	24⅞ *(632)*	28¼ *(718)*	19¾ *(502)*	12½ *(318)*	12 *(305)*	14 *(356)*	16⅞ *(429)*
CW-141, 161	28⅞ *(733)*	29¾ *(756)*	22⅛ *(562)*	15½ *(394)*	15 *(381)*	17 *(432)*	19⅜ *(492)*
CW-180, 200	35⅜ *(905)*	28⅝ *(727)*	27¾ *(705)*	17½ *(445)*	17 *(432)*	19 *(483)*	25 *(635)*

All dimensions in inches (millimeters). *NOTE: 2 inches minimum, 8 inches when motorized option is required. *May vary depending on motor size.



CWB - Belt Drive Dimensions							
Model	A	B**	C	Wall Opening	Damper Size	Damper Frame Size	Mounting Bolt Circle
CWB-098, 101, 121, 131	24⅞ *(632)*	28¼ *(718)*	19¾ *(502)*	12½ *(318)*	12 *(305)*	14 *(356)*	16⅞ *(429)*
CWB-141, 161	28⅞ *(733)*	29¾ *(756)*	22⅛ *(562)*	15½ *(394)*	15 *(381)*	17 *(432)*	19⅜ *(492)*
CWB-180, 200	35⅜ *(899)*	28⅝ *(727)*	27¾ *(705)*	17½ *(445)*	17 *(432)*	19 *(483)*	25 *(635)*
CWB-220, 240	42²⁵⁄₃₂ *(1087)*	33⅞ *(860)*	31¼ *(794)*	20½ *(521)*	20 *(508)*	22 *(559)*	28⅜ *(721)*
CWB-300	50 *(1270)*	36 *(914)*	38⅜ *(975)*	25½ *(648)*	25 *(635)*	27 *(686)*	35²⁷⁄₃₂ *(910)*

All dimensions in inches (millimeters). *NOTE: 2 inches minimum, 7 inches when motorized option is required. **May vary depending on motor size.



Receiving

Upon receiving the product, check to make sure all items are accounted for by referencing the bill of lading to ensure all items were received. Inspect each crate for shipping damage before accepting delivery. Notify the carrier if any damage is noticed. The carrier will make notification on the delivery receipt acknowledging any damage to the product. All damage should be noted on all the copies of the bill of lading which is countersigned by the delivering carrier. A Carrier Inspection Report should be filled out by the carrier upon arrival and reported to the Traffic Department. If damaged upon arrival, file a claim with carrier. Any physical damage to the unit after acceptance is not the responsibility of Greenheck Fan Corporation.

Unpacking

Verify that all required parts and the correct quantity of each item have been received. If any items are missing, report shortages to your local representative to arrange for obtaining missing parts. Sometimes it is not possible that all items for the unit be shipped together due to availability of transportation and truck space. Confirmation of shipment(s) must be limited to only items on the bill of lading.

Handling

The motor amperage and voltage ratings must be checked for compatibility to supply voltage prior to final electrical connection. For CW/CWB installations, the electrical supply should be routed through the conduit chase located between the mounting plate and the bottom of the motor compartment. Wiring must conform to local and national codes.

CAUTION

Do not lift by the fan hood. Avoid lifting fans in a way that will bend or distort fan parts. Never pass slings or timbers through the venturi of fan. Fans with special coatings or paints must be protected in handling to prevent damage.

Storage

Fans are protected against damage during shipment. If the unit cannot be installed and operated immediately, precautions need to be taken to prevent deterioration of the unit during storage. The user assumes responsibility of the fan and accessories while in storage. Greenheck Fan Corporation will not be responsible for damage during storage. These suggestions are provided solely as a convenience to the user.

Indoor

The ideal environment for the storage of fans and accessories is indoors, above grade, in a low humidity atmosphere which is sealed to prevent the entry of blowing dust, rain or snow. Temperatures should be evenly maintained between 30° to 110°F (-1° to 43°C)

(wide temperature swings may cause condensation and “sweating” of metal parts). All accessories must be stored indoors in a clean, dry atmosphere.

Remove any accumulations of dirt, water, ice, or snow and wipe dry before moving to indoor storage. To avoid “sweating” of metal parts, allow cold parts to reach room temperature. To dry parts and packages use a portable electric heater to get rid of any moisture buildup. Leave coverings loose to permit air circulation and to allow for periodic inspection.

The unit should be stored at least 3½ in. (89 mm) off the floor on wooden blocks covered with moisture proof paper or polyethylene sheathing. Aisles between parts and along all walls should be provided to permit air circulation and space for inspection.

Outdoor

Fans designed for outdoor applications may be stored outdoors, if absolutely necessary. Roads or aisles for portable cranes and hauling equipment are needed.

The fan should be placed on a level surface to prevent water from leaking into the fan. The fan should be elevated on an adequate number of wooden blocks so that it is above water and snow levels and has enough blocking to prevent it from settling into soft ground. Locate parts far enough apart to permit air circulation, sunlight and space for periodic inspection. To minimize water accumulation, place all fan parts on blocking supports so that rain water will run off.

Do not cover parts with plastic film or tarps as these cause condensation of moisture from the air passing through heating and cooling cycles.

Fan wheels should be blocked to prevent spinning caused by strong winds.

Inspection and Maintenance During Storage

While in storage, inspect fans once per month. Keep a record of inspection and maintenance performed.

If moisture or dirt accumulations are found on parts, the source should be located and eliminated. At each inspection, rotate the wheel by hand ten to fifteen revolutions to distribute lubricant on motor. If paint deterioration begins, consideration should be given to touch-up or repainting. Fans with special coatings may require special techniques for touch-up or repair.

Machined parts coated with rust preventive should be restored to good condition promptly if signs of rust occur. Immediately remove the original rust preventive coating with petroleum solvent and clean with lint-free cloths. Polish any remaining rust from surface with crocus cloth or fine emery paper and oil. Do not destroy the continuity of the surfaces. Thoroughly wipe clean with Tectyl® 506 (Ashland Inc.) or the equivalent. For hard to reach internal surfaces or for occasional use, consider using Tectyl® 511M Rust Preventive, WD-40® or the equivalent.

Removing From Storage

As fans are removed from storage to be installed in their final location, they should be protected and maintained in a similar fashion until the fan equipment goes into operation.

Installation

These fans exhaust directly away from the building, therefore their location and placement should be analyzed. Proximity to nearby buildings and people must be considered.

Access to the motor compartment is accomplished by removing the screws from the cover. The cover can then be removed and placed on a flat surface in an area protected from strong winds.

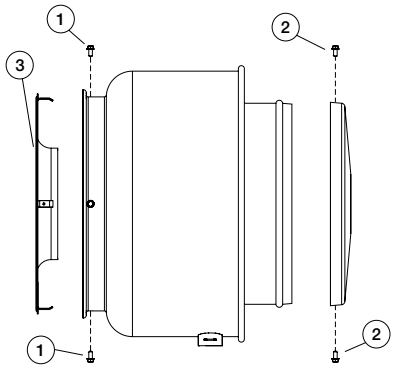
The motor’s amperage and voltage rating must be checked for compatibility to the supply voltage prior to final electrical connection. For NFPA Restaurant Applications, the electrical supply must enter the motor compartment through the breather tube. For other non-flammable applications the electrical supply can be routed through the conduit chase between the mounting plate and the bottom of the motor compartment. Consult local code authorities for your specific requrements. UL/cUL 762 Installations are for Restaurant Applications.

All CWB fans and CW fans with A, B and C motor RPMs are the only fans approved for this installation. All must include the suffix “G”.

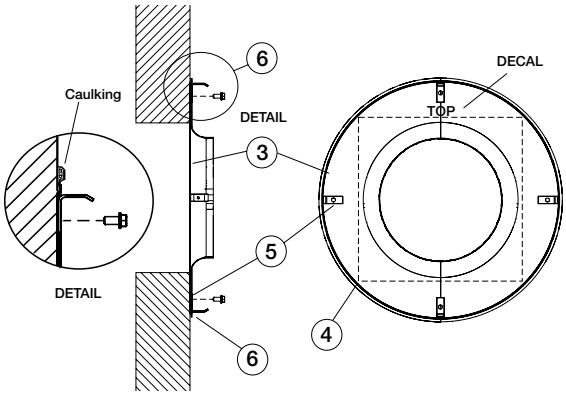
All fans must be installed per NFPA 96 and meet all local code requirements. In addition, the maximum operating temperature at the fan must not exceed 375°F (191°C).

Typical Wall Mounting Installation

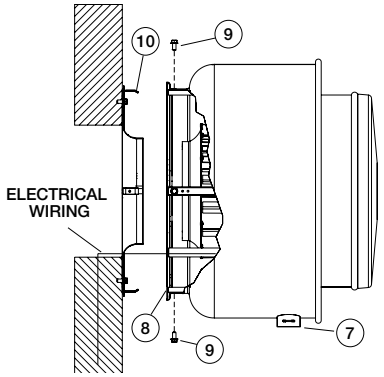
1. Remove mounting plate from unit by removing the fasteners shown above marked by (1). Remove motor compartment cover by removing fasteners marked by (2).



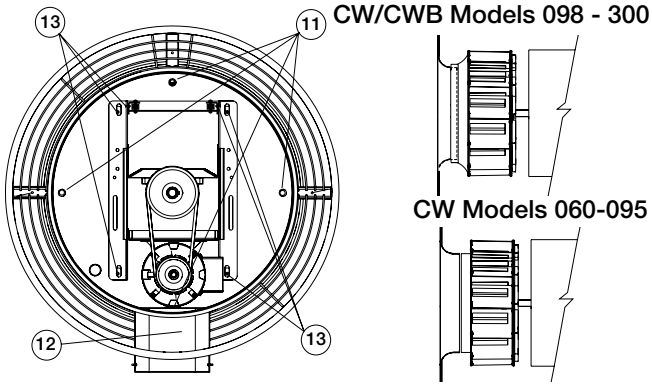
2. Locate the mounting plate (3) at the desired position and check to avoid unit clearance problems. Cut the wall opening (4) as shown based upon dimensions obtained from the Dimensional Data Section. Locate top of mounting plate (decal) and attach to the wall construction. The fasteners must pass through the holes provided in the mounting angle clips (5) on the mounting plate (3). For uneven surfaces, shims may be required. Sealant or caulking should be applied in the groove (6) formed by the mounting plate and the wall to prevent moisture leakage into the building.



3. Once the mounting plate has been attached to the wall, the unit can be installed. The unit should be aligned with the breather tube (7) pointing down. The electrical chase should be guided through the hole in the motor compartment. The horizontal support channels (8) should slide over the mounting angle clips (10) on the mounting plate until the holes in the windband and clips are aligned. Replace fasteners (9) and tighten. Wiring now can be done. Consult local code authorities for your specific requirements.



4. During shipping, wheel position may shift. Alignment should be as shown above (centered in the inlet) and can be accomplished by loosening the fasteners (11) located in the motor compartment. For belt drive units, additional vertical alignment can be accomplished by loosening the four fasteners on the drive frame support angles, and the 2 fasteners that hold the L-brackets to the support angles on top (13). Also, horizontal alignment can be made by loosening the bearings from the bearing plate. Removal of the entire power pack (motor, drives and wheel) for maintenance or cleaning can be accomplished by removing the breather tube (12) and fasteners (11).



Pre-Starting Checks

1. Check all fasteners and setscrews for tightness. The wheel should rotate freely and be aligned as shown in figure 7.
2. Wheel position is preset and the unit is test run at the factory. Movement may occur during shipment and realignment may be necessary.

Wheel Overlap and Gap Dimensions

Model	G - Overlap in (mm)	H - Gap in (mm)
060-095	–	3/32 *(2)*
098-161	1/4 *(6)*	–
180-300	1/2 *(13)*	–

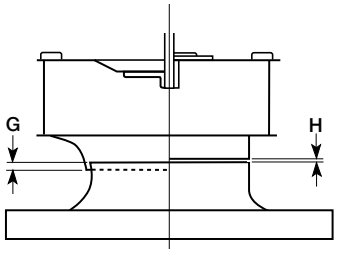
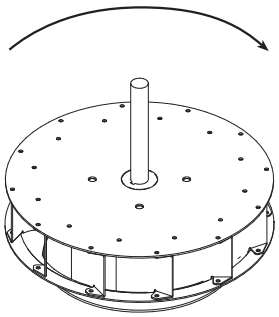


Figure 7

3. Only CW unit - Centering height alignment can be accomplished by loosening the set screws in the wheel and moving the wheel to the desired position.
4. Only CWB unit - Centering can be accomplished by loosening the bolts holding the drive frame to the shock mounts and repositioning the drive frame.
5. Only CWB unit - Wheel and inlet cone overlap can be adjusted by loosening the setscrews in the wheel and moving the wheel to the desired position.
6. Only CWB unit - Fan RPM should be checked and verified with a tachometer.
7. Check wheel rotation (viewing from the shaft side) by momentarily energizing the unit. Rotation should be clockwise and correspond to the rotation decal on the unit, see figure 8. If wheel rotation is incorrect reverse two of the wiring leads or check motor wiring for single phase.

Wheel Rotation

All CW and CWB models have clockwise rotation when viewed from top of fan



Clockwise
Airflow

Figure 8

WARNING

Correct direction of wheel rotation is critical. Reversed rotation will result in poor air performance, motor overloading and possible burnout.

Model CWB

Pre-Starting Belt Tension Checks

8. Always loosen tension enough to install belts without stretching, see figure 9.

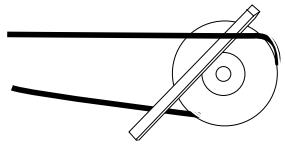


Figure 9

Do not force belt(s). Forcing the belt(s) will break the cords and cause belt failure

9. For units with two groove pulleys, adjust so the tension is equal in both belts.
10. If adjustments are made, it is very important to check the pulleys for proper alignment. Misaligned pulleys lead to excessive belt wear vibration, noise and power loss, see figure 10.

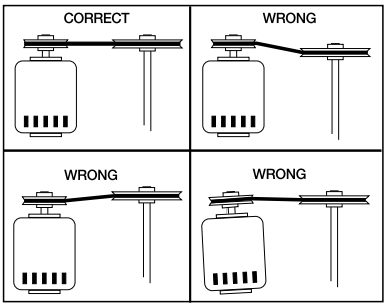


Figure 10

11. For CWB units: Belt tension can be adjusted by loosening four fasteners on the drive frame, see figure 11. The motor plate slides on the slotted adjusting arms and drive frame angles in the same manner.

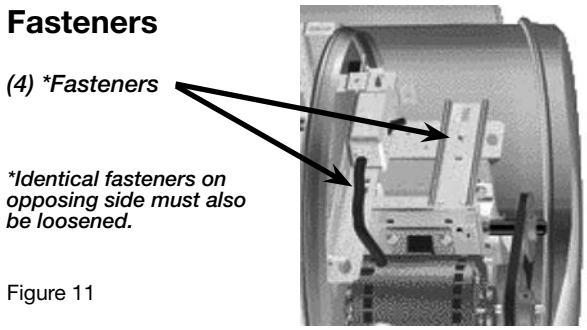


Figure 11

12a. Sizes 071-161: Belts should be tensioned just enough to prevent slippage at full load. Belts should have a slight bow on the slack side while running at full load (see figure 12a).

12b. Sizes 180-540: Belt tension should be adjusted to allow 1/64 in. (0.397 mm) of deflection per inch of belt span. For example, a 15 in. (381 mm) belt span should have 15/64 in. (0.234 mm) (or about 1/4 in. (6 mm)) of deflection with moderate thumb pressure at mid-point between pulleys (see figure 12b).

WARNING

The fan has been checked for mechanical noises at the factory prior to shipment. If mechanical noise should develop, suggested corrective actions are offered in the Troubleshooting section.

IMPORTANT

Over tightening will cause excessive bearing wear and noise. Too little tension will cause slippage at startup and uneven wear.

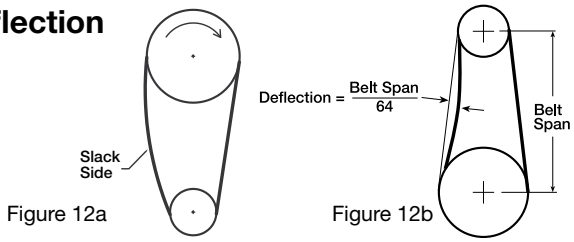


Figure 12a

Figure 12b

13. The adjustable motor pulley is factory set for the RPM specified. Speed can be increased by closing or decreased by opening the adjustable motor pulley. Two groove variable pitch pulleys must be adjusted an equal number of turns open or closed.
14. Any increase in speed represents a substantial increase in the horsepower required by the unit.
15. Motor amperage should always be checked to avoid serious damage to the motor when speed is varied.

Operation: CW/CWB

1. Before starting up or operating fan, check all fasteners for tightness. In particular, check the setscrews in wheel hub (and pulleys, if applicable).
2. While in the OFF position or before connecting the fan to power, turn the fan wheel by hand to be sure it is not striking the venturi or any obstacle.
3. Start the fan and shut it off immediately to check rotation of the wheel with directional arrow in the motor compartment, see figure 8.
4. When the fan is started, observe the operation and check for any unusual noises.
5. With the system in full operation and all ductwork attached, measure current input to the motor and compare with the nameplate rating to determine if the motor is operating under safe load conditions.
6. Keep inlets and approaches to fan clean and free from obstruction.

Inspection: CW/CWB

Inspection of the fan should be conducted at the first 30 minute and 24 hour intervals of satisfactory operation.

30 Minute Interval

Inspect bolts, setscrews and motor mounting bolts. Adjust and tighten as necessary.

24 Hour Interval

Check all internal components. On CWB unit only, inspect belt alignment and tension. Adjust and tighten as necessary.

IMPORTANT

Adjust (tighten) belt tension after the first 24-48 hours of operation.

Maintenance: CW/CWB

A proper maintenance program will help these units deliver years of dependable service. Installation and maintenance are to be performed only by qualified personnel who are familiar with local codes and regulations and who are experienced with this type of equipment.

Motor maintenance is generally limited to cleaning and lubrication (where applicable). Cleaning should be limited to exterior surfaces only. Removing dust buildup on motor housing ensures proper motor cooling.

Greasing of motors is only intended when fittings are provided. Many fractional horsepower motors are permanently lubricated and should not be lubricated after installation. Motors supplied with grease fittings should be greased in accordance with manufacturers' recommendations. Where motor temperatures do not exceed 104ºF (40ºC), the grease should be replaced after 2,000 hours of running time as a general rule.

Wheels require very little attention when moving clean air. Occasionally, oil and dust may accumulate causing imbalance. When this occurs the wheel and housing should be cleaned to ensure smooth and safe operation.

All fasteners should be checked for tightness each time maintenance checks are performed prior to restarting unit.

A proper maintenance program will help these units deliver years of dependable service.

Belt/Bearing Maintenance CWB Unit

1. Belts tend to stretch after a period of time. They should be checked periodically for wear and tightness. When replacing belts, use the same type as supplied with the unit.
2. Matched belts should always be used on units with multi-groove pulleys.
3. For belt replacement, loosen the tensioning device enough to allow removal of the belt by hand. Do not force the belts on or off. This may cause cords to break, leading to premature failure.

WARNING

Always disconnect, lock and tag power source before servicing. Failure to disconnect power source can result in fire, shock or serious injury.

CAUTION

Uneven cleaning of the wheel will produce an out of balance condition that will cause vibration in the fan.

WARNING

This unit should be made non-functional when cleaning the wheel or housing (fuses removed, disconnect locked off).

4. Once installed, adjust belts as shown in "Pre-Starting Checks."
5. Shaft bearings can be classified in two groups:relubricating and non-relubricating. All non-relubricating bearings on standard model CWB fans are factory lubricated and require no further lubrication under normal use (between -20º to 180ºF (-29º to 82ºC) in a relatively clean environment).
6. Units installed in hot, humid or dirty locations should be equipped with special bearings. These bearings will require frequent lubrication. On CWB belt driven fans, the standard cast pillow block bearings are factory lubricated and are provided with external grease fittings. Annual lubrication is recommended, or more frequently if needed, see Table 2. Do not over-grease. Use only one or two shots of lubricant with a hand gun. Maximum hand gun rating is 40 psi. Rotate bearings during lubrication where good safety practice permits. Caution should be employed to prevent over packing or contamination.
7. Grease fittings should be wiped clean. The unit should be in operation while lubricating. Extreme care should be used around moving parts.
8. Grease should be pumped in very slowly until a slight bead forms around the seal. A high grade lithium base grease should be used.
9. When installing restaurant exhaust applications follow NFPA 70 for cleaning fans.
10. Grease containers must be emptied at regular intervals to prevent overflow.
11. To ensure tightness, check pulley setscrews. Proper keys must be in keyways.
12. Fan RPM should not be readjusted. Only use pulleys of identical size and type when replacing pulleys.
13. During the first few months of operation check bearing set screws periodically to ensure tightness.
14. If unit is to be left idle for an extended period, remove belts and store in a cool, dry place to avoid premature belt failure.

Recommended Relubrication Frequency in Months

NOTE: If unusual environment conditions exist (extreme temperature, moisture or contaminants) more frequent lubrication is required.

A good quality lithium base grease, conforming to NLGI Grade 2 consistency, such as those listed here may be used.

Table 2: Suggested Fan Bearing Greasing Intervals	
Interval (months)	Type of Service
1 to 3	Heavy duty in dirty, dusty locations; high ambient temperatures; moisture laden atmosphere; vibration.
3 to 6	12 to 24 hours per day, heavy duty, or if moisture is present
6 to 12	8 to 16 hours per day in clean, relatively dry atmosphere
12 to 18	Infrequent operation or light duty in clean atmosphere

Table 3: Grease Manufacturers	
Manufacturer	Grease (NLGI #2)
U.S. Electric Motors	Grease No. 83343
Chevron U.S.A. Inc	Chevron SRI Grease #2
Mobil Oil Corporation	Mobilith
	Mobil 532
Texaco, Inc.	Premium BRB #2
	Texaco Multifak #2
Amoco Oil Co.	Rykon Premium #2
Exxon	Unirex N2
Shell	B Shell Alvania #2

Parts List

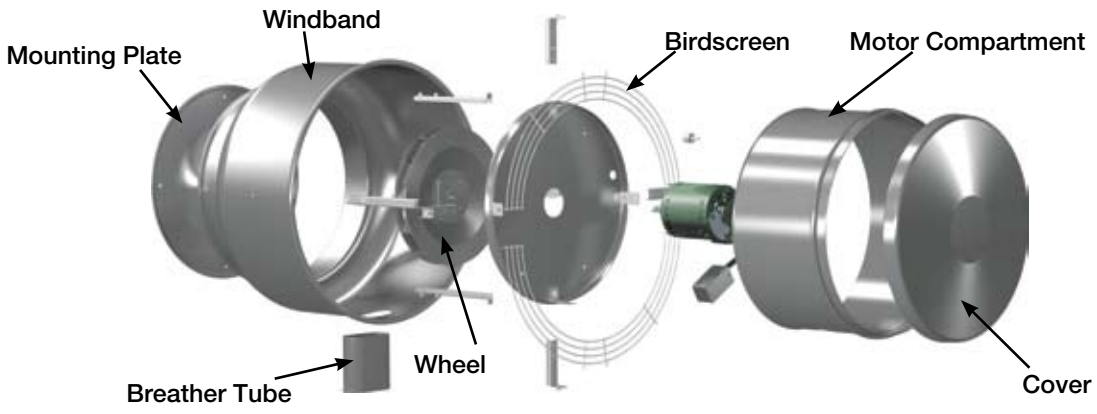
NOTE

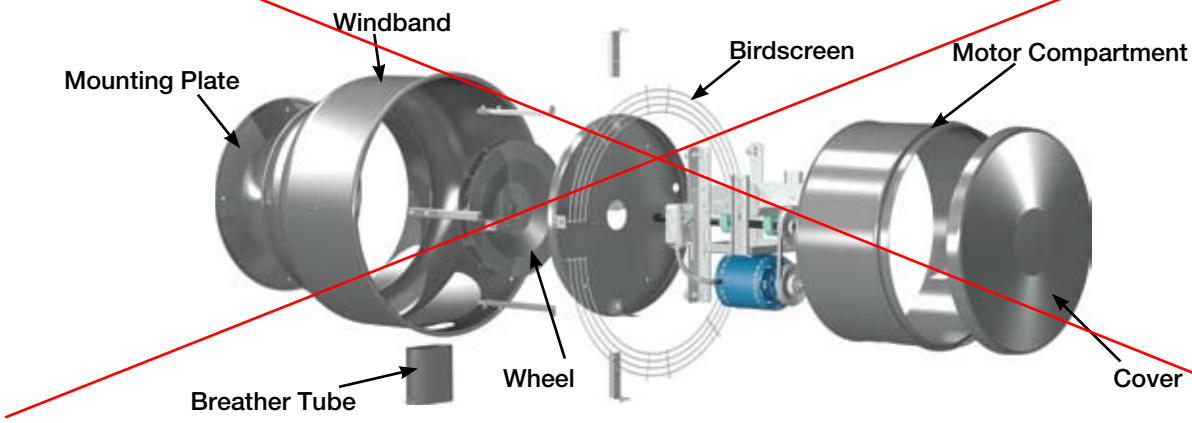
Each fan bears a manufacturer's nameplate with model number and serial number embossed. This information will assist the local Greenheck representative and the factory in providing service and replacement parts. Before taking any corrective action, make certain unit is not capable of operation during repairs.

CAUTION

A fan manufactured with an explosion resistant motor does not certify the entire unit to be explosion proof.

CW Direct Drive Centrifugal Sidewall Exhaust Fan





Troubleshooting

WARNING: Before taking any corrective action, make certain unit is not capable of operation during repairs.

PROBLEM	CAUSE	CORRECTIVE ACTION
Excessive Noise or Vibration	Bad Bearings	Replace.
	Wheel unbalance	Clean and remove all dirt buildup off wheel. Check wheel balance, rebalance in place if necessary.
	Belts too tight or too loose	Adjust tension, see figure 12a-b.
	Wheel improperly aligned and rubbing	Center wheel on inlet, see figure 7.
	Loose drive or motor pulleys	Align and tighten. See “Pre-Starting Checks”, see page 4-6.
	Foreign objects in wheel or housing	Remove objects, check for damage or unbalance.
Reduced airflow	System resistance too high	Check system: Proper operation of backdraft or control dampers, obstruction in ductwork, clean dirty filters.
	Unit running backwards	Correct as shown in figure 8.
	Excessive dirt buildup on wheels	Clean wheel.
	Improper wheel alignment	Center wheel on inlets, see Pre-Starting checks and figure 7.

Warranty

Greenheck warrants this equipment to be free from defects in material and workmanship for a period of one year from the purchase date. Any units or parts which prove defective during the warranty period will be replaced at our option when returned to our factory, transportation prepaid. Motors are warranted by the motor manufacturer for a period of one year. Should motors furnished by Greenheck prove defective during this period, they should be returned to the nearest authorized motor service station. Greenheck will not be responsible for any removal or installation costs.
As a result of our commitment to continuous improvement, Greenheck reserves the right to change specifications without notice.

GREENHECK
Building Value in Air.

Greenheck Catalog Series C provides additional information describing the equipment, fan performance, available accessories, and specification data.

AMCA Publication 410-96, Safety Practices for Users and Installers of Industrial and Commercial Fans, provides additional safety information. This publication can be obtained from AMCA International, Inc. at: www.amca.org.

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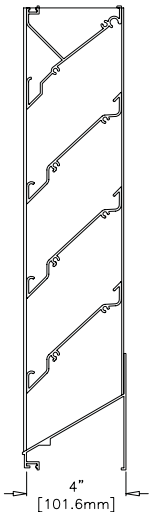
Louvers L-801 (24"x24") and L-802 (30"x60").

GREENHECK ESD-403

Stationary Louver
Drainable Blade

Application and Design

ESD-403 is a weather louver designed to protect air intake and exhaust openings in building exterior walls. Design incorporates a drainable head member and stationary horizontal blades to channel water to the jambs which guides the water through vertical downspouts for escape at the sill. The ESD-403 is an extremely efficient louver with **AMCA LICENSED PERFORMANCE DATA** enabling designers to select and apply with confidence.



Standard Construction

Frame . . . . . Heavy gauge extruded 6063-T5 aluminum, 4 in. x 0.081 in. nominal wall thickness

Blades . . . . . Drainable design, heavy gauge extruded 6063-T5 aluminum, 0.081 in. nominal wall thickness, positioned at 37° and 45° angles on approximately 4 in. centers

Construction . . . Mechanically fastened

Birdscreen. . . . . 3/4 in. x 0.051 in. flattened expanded aluminum in removable frame, inside mount (rear)

Finish. . . . . Mill

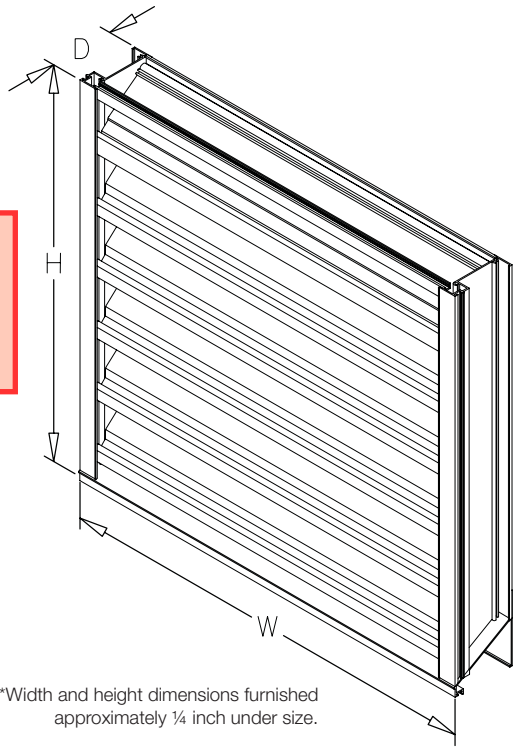
Minimum Size . . 12 in. W x 12 in. H

Maximum Single Section Size . . . 120 in. W or 120 in. H (limited to 70 ft. sq.)

Options *(at additional cost)*

- A variety of bird and insect screens
- Blank off panel
- Clip angles
- Extended sill
- Filter rack
- Flanged frame
- Glazing adaptor
- Hinged frame
- Security bars
- Welded construction
- 0.125 nominal wall thickness
- A variety of architectural finishes including:
  - Clear anodize
  - Integral color anodize
  - Baked enamel paint
  - Kynar paint

Both Louvers to be Provided with WD-400 Gravity Operated Damper. See Attached Cut Sheet.



*Width and height dimensions furnished approximately ¼ inch under size.

PERFORMANCE DATA

ESD-403

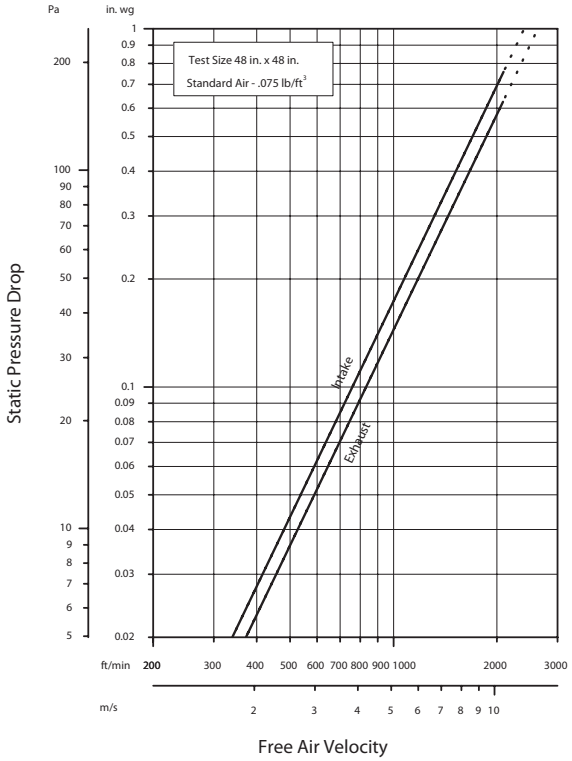
Stationary Louver Drainable Blade
Extruded Aluminum

Free Area Chart (Sq. ft.)

Height in Inches	Width in Inches																			
	12	18	24	30	36	42	48	54	60	66	72	78	84	90	96	102	108	114	120
16	0.46	0.76	1.06	1.35	1.65	1.95	2.25	2.47	2.77	3.07	3.37	3.67	3.97	4.26	4.56	4.79	5.08	5.38	5.68
18	0.50	0.83	1.15	1.48	1.81	2.13	2.46	2.70	3.03	3.35	3.68	4.01	4.33	4.66	4.98	5.22	5.54	5.87	6.19
24	0.77	1.24	1.78	2.28	2.78	3.28	3.78	4.16	4.67	5.17	5.67	6.17	6.67	7.17	7.67	8.03	8.54	9.04	9.54
30	0.97	1.59	2.19	2.85	3.48	4.10	4.73	5.23	5.83	6.46	7.09	7.71	8.34	8.97	9.59	10.04	10.67	11.30	11.92
36	1.17	1.93	2.69	3.45	4.21	4.97	5.73	6.31	7.07	7.83	8.59	9.35	10.11	10.87	11.63	12.17	12.93	13.69	14.45
42	1.44	2.37	3.30	4.23	5.16	6.09	7.02	7.73	8.66	9.59	10.52	11.45	12.38	13.31	14.24	14.91	15.84	16.77	17.70
48	1.64	2.70	3.76	4.82	5.88	6.94	**8.00**	8.80	9.86	10.92	11.98	13.04	14.10	15.16	16.22	16.98	18.04	19.10	20.16
54	1.91	3.14	4.38	5.61	6.85	8.08	9.32	10.26	11.49	12.73	13.96	15.20	16.44	17.67	18.91	19.79	21.03	22.26	23.50
60	2.10	3.47	4.83	6.20	7.56	8.93	10.29	11.33	12.69	14.05	15.42	16.78	18.15	19.51	20.88	21.85	23.22	24.58	25.95
66	2.38	3.92	5.46	7.00	8.54	10.08	11.62	12.79	14.33	15.98	17.41	18.96	20.50	22.04	23.58	24.68	26.22	27.77	29.31
72	2.57	4.24	5.90	7.57	9.23	10.90	12.57	13.83	15.50	17.16	18.83	20.50	22.16	23.83	25.49	26.69	28.35	30.02	31.69
78	2.77	4.57	6.37	8.17	9.97	11.76	13.56	14.93	16.72	18.52	20.32	22.12	23.92	25.73	27.51	28.80	30.60	32.40	34.20
84	3.04	5.01	6.98	8.95	10.92	12.89	14.86	16.35	18.32	20.29	22.26	24.23	26.20	28.18	30.15	31.56	33.53	35.50	37.47
90	3.24	5.34	7.44	9.54	11.64	13.74	15.84	17.43	19.53	21.63	23.73	25.83	27.93	30.03	32.12	33.63	36.73	37.83	39.93
96	3.51	5.78	8.06	10.33	12.61	14.88	17.16	18.88	21.16	23.44	25.71	27.99	30.26	32.54	34.81	36.44	38.72	40.99	43.27
102	3.71	6.10	8.51	10.92	13.31	15.72	18.13	19.95	22.35	24.75	27.16	29.56	31.96	34.37	36.77	38.49	40.90	43.30	45.70
108	3.98	6.56	9.14	11.72	14.30	16.88	19.46	21.42	24.00	26.58	29.16	31.74	34.32	36.90	39.48	41.33	43.91	46.49	49.07
114	4.17	6.88	9.58	12.29	14.99	17.70	20.40	22.46	25.16	27.87	30.57	33.28	35.98	38.69	41.39	43.33	46.04	48.74	51.45
120	4.37	7.21	10.05	12.88	15.72	18.56	21.39	23.54	26.38	29.22	32.05	34.89	37.73	40.57	43.43	45.43	48.27	51.11	53.94

Greenheck Fan Corporation certifies that the ESD-403 louvers shown herein are licensed to bear the AMCA Seal. The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 511 and comply with the requirements of the AMCA Certified Ratings Program. The AMCA Certified Ratings Seal applies to air performance and water penetration ratings.

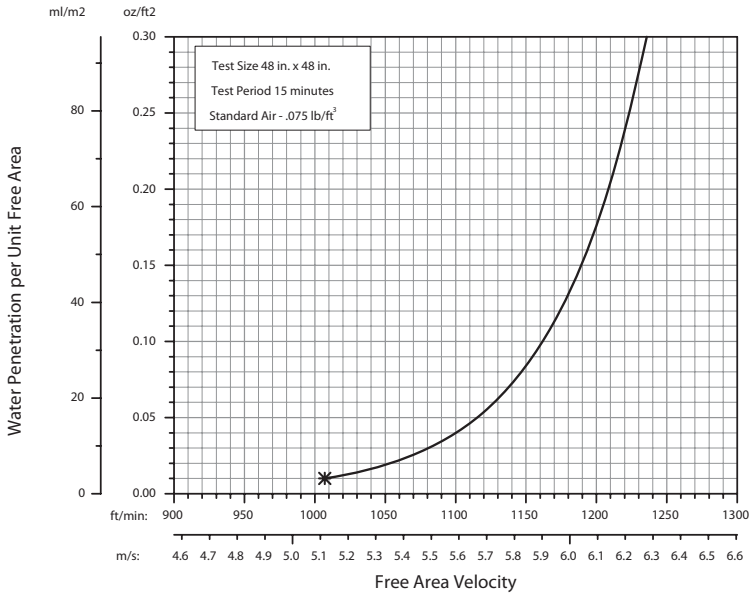
Airflow Resistance (Standard Air - .075 lb/ft³)



Model ESD-403 resistance to airflow (pressure drop) varies depending on louver application (air intake or air exhaust). Free area velocities (shown) are higher than average velocity through the overall louver size. See louver selection information.

Water Penetration (Standard Air - .075 lb/ft³)

Test size 48 in. x 48 in. Test duration of 15 min.



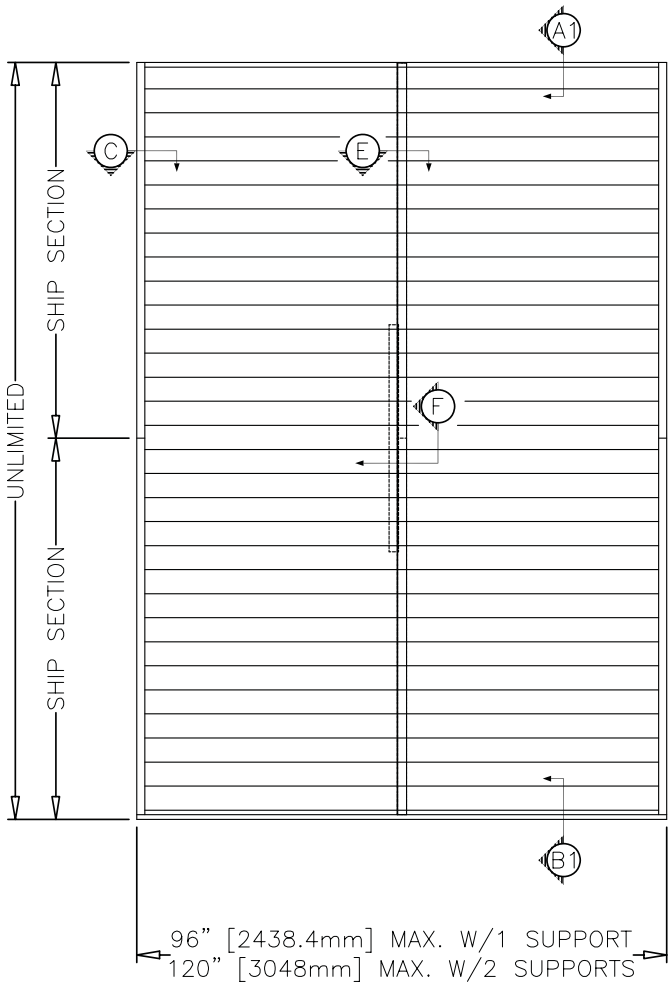
The AMCA Water Penetration Test provides a method for comparing various louver models and designs as to their efficiency in resisting the penetration of rainfall under specific laboratory test conditions. The beginning point of water penetration is defined as that velocity where the water penetration curve projects through .01 oz. of water (penetration) per sq. ft. of louver free area. ***The beginning point of water penetration for Model ESD-403 is 1007 fpm free area velocity.** These performance ratings do not guarantee a louver to be weatherproof or stormproof and should be used in combination with other factors including good engineering judgement in selecting louvers.

GREENHECK

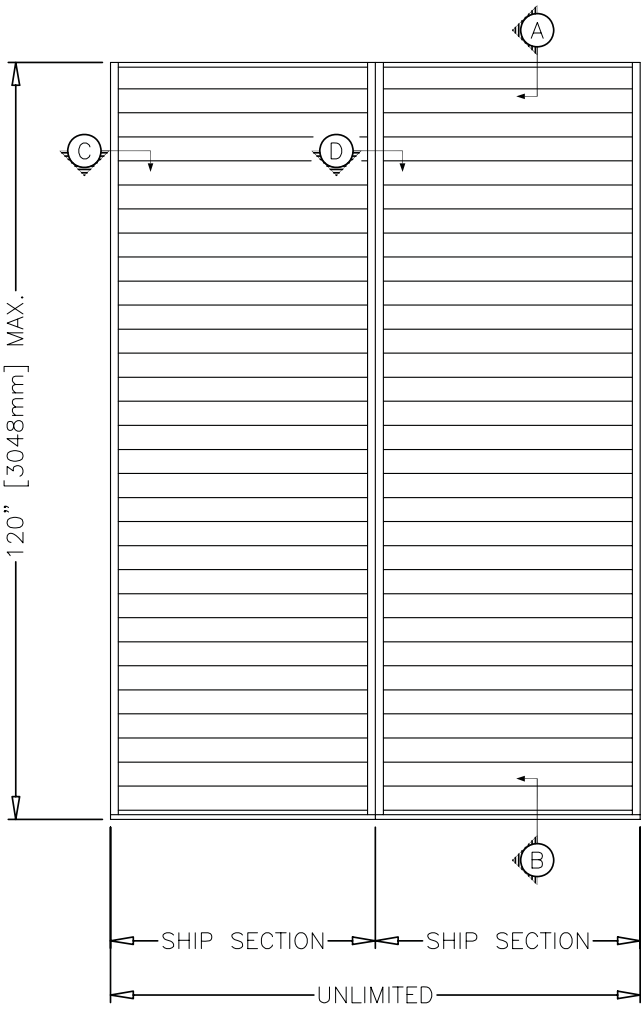
Maximum Size and Installation Information

Maximum single section size for model ESD-403 is 120 in. W x 84 in. H or 84 in. W x 120 in. H (70 sq. ft). Larger openings require field assembly of multiple louver panels to make up the overall opening size. Individual louver panels are designed to withstand a 25 PSF wind-load (please consult Greenheck if the louvers must withstand higher wind-loads). Structural reinforcing members may be required to adequately support and install multiple louver panels within a large opening. Structural reinforcing members along with any associated installation hardware is not provided by Greenheck unless indicated otherwise by Greenheck. Additional information on louver installation may be found in AMCA Publication #501, Louver Application Manual.

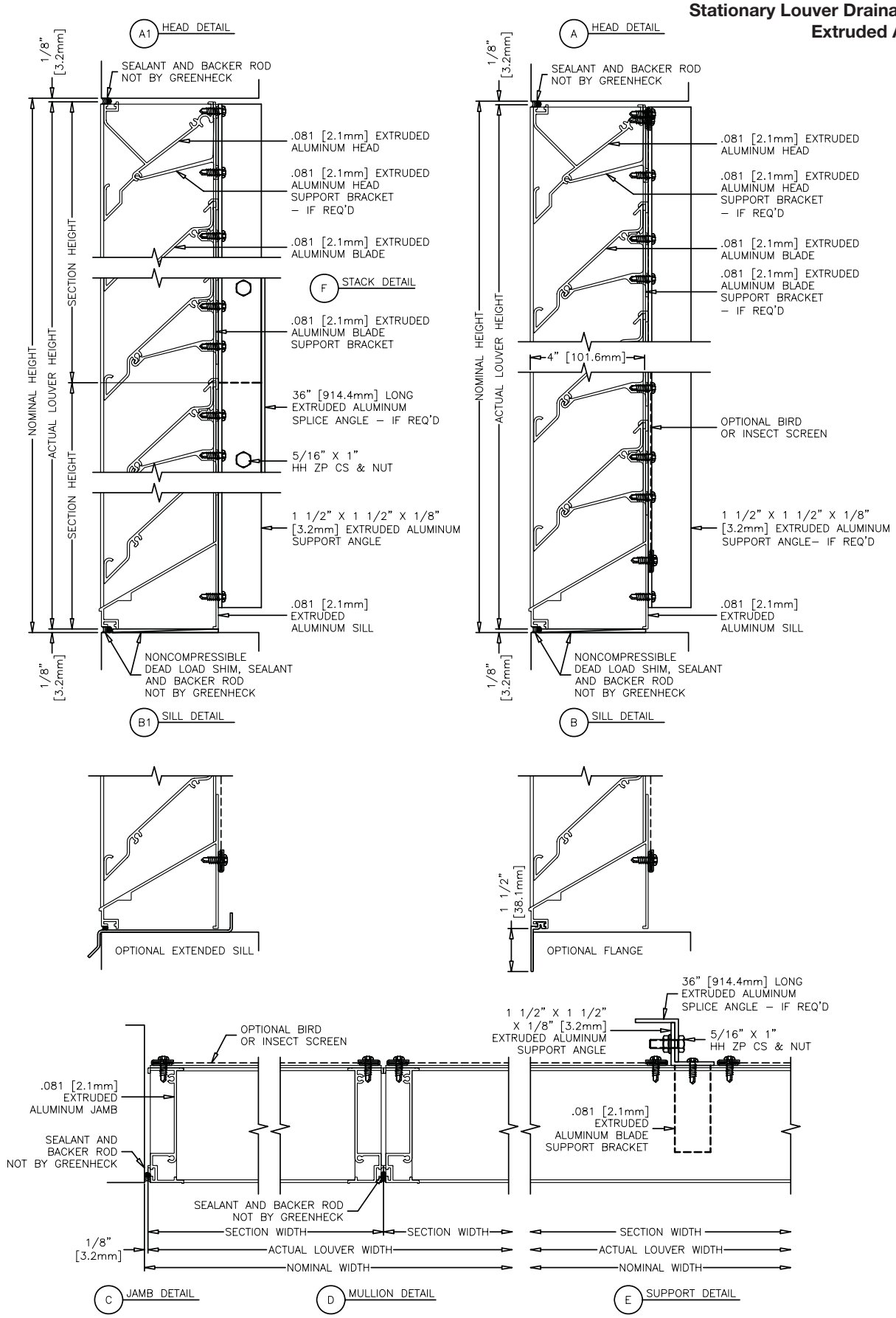
SINGLE SECTION
W/ SUPPORT ANGLES



MULTIPLE SECTION W/ MULLION



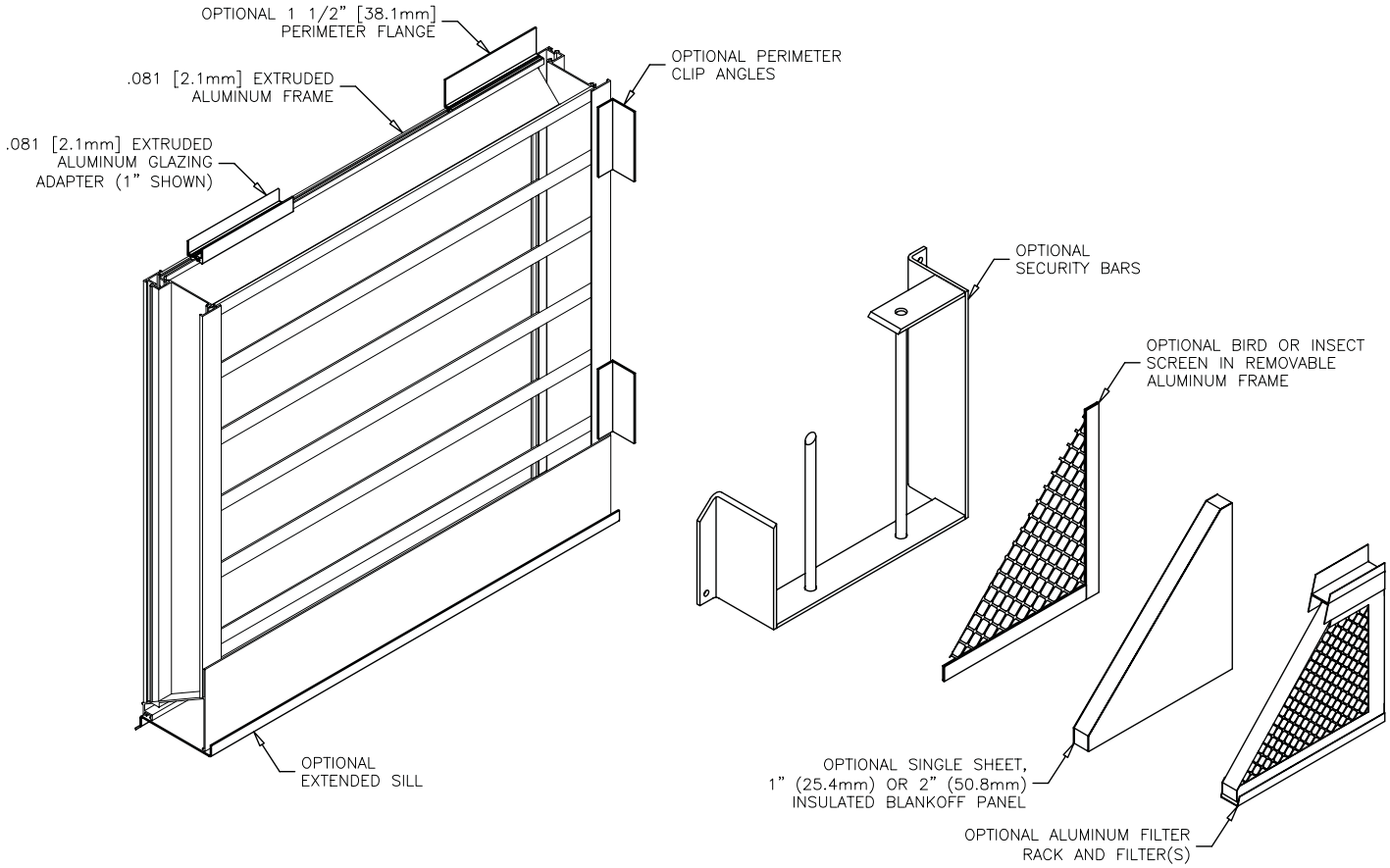
Minimum Single Section Size	Maximum Single Section Size
12 in. W x 12 in. H	70 ft. sq.


A1 HEAD DETAIL
1/8" [3.2mm]
SEALANT AND BACKER ROD NOT BY GREENHECK
.081 [2.1mm] EXTRUDED ALUMINUM HEAD
.081 [2.1mm] EXTRUDED ALUMINUM HEAD SUPPORT BRACKET – IF REQ'D
.081 [2.1mm] EXTRUDED ALUMINUM BLADE
F STACK DETAIL
.081 [2.1mm] EXTRUDED ALUMINUM BLADE SUPPORT BRACKET
36" [914.4mm] LONG EXTRUDED ALUMINUM SPLICE ANGLE – IF REQ'D
5/16" X 1" HH ZP CS & NUT
1 1/2" X 1 1/2" X 1/8" [3.2mm] EXTRUDED ALUMINUM SUPPORT ANGLE
.081 [2.1mm] EXTRUDED ALUMINUM SILL
NONCOMPRESSIBLE DEAD LOAD SHIM, SEALANT AND BACKER ROD NOT BY GREENHECK
NOMINAL HEIGHT
ACTUAL LOUVER HEIGHT
SECTION HEIGHT
B1 SILL DETAIL
A HEAD DETAIL
4" [101.6mm]
OPTIONAL BIRD OR INSECT SCREEN
B SILL DETAIL
OPTIONAL EXTENDED SILL
1 1/2" [38.1mm]
OPTIONAL FLANGE
OPTIONAL BIRD OR INSECT SCREEN
.081 [2.1mm] EXTRUDED ALUMINUM JAMB
SEALANT AND BACKER ROD NOT BY GREENHECK
1 1/2" X 1 1/2" X 1/8" [3.2mm] EXTRUDED ALUMINUM SUPPORT ANGLE
.081 [2.1mm] EXTRUDED ALUMINUM BLADE SUPPORT BRACKET
SECTION WIDTH
ACTUAL LOUVER WIDTH
NOMINAL WIDTH
C JAMB DETAIL
D MULLION DETAIL
E SUPPORT DETAIL

OPTION DRAWINGS

ESD-403

Stationary Louver Drainable Blade
Extruded Aluminum


OPTIONAL 1 1/2" [38.1mm] PERIMETER FLANGE
.081 [2.1mm] EXTRUDED ALUMINUM FRAME
.081 [2.1mm] EXTRUDED ALUMINUM GLAZING ADAPTER (1" SHOWN)
OPTIONAL PERIMETER CLIP ANGLES
OPTIONAL SECURITY BARS
OPTIONAL BIRD OR INSECT SCREEN IN REMOVABLE ALUMINUM FRAME
OPTIONAL EXTENDED SILL
OPTIONAL SINGLE SHEET, 1" (25.4mm) OR 2" (50.8mm) INSULATED BLANKOFF PANEL
OPTIONAL ALUMINUM FILTER RACK AND FILTER(S)

FINISHES

Finish Type	Description/Application	Color Selection	Standard Warranty (Aluminum)
2-coat 70% KYNAR 500®/HYLAR 5000® AAMA 2605 – Dry film thickness 1.2 mil. (AKA: Duranar®, Fluoropon®, Trinar®, Flouropolymer, Polyvinylidene Fluoride, PVDF2)	***"Best."*** The premier finish for extruded aluminum. Tough, long-lasting coating has superior color retention and abrasive properties. Resists chalking, fading, chemical abrasion and weathering.	**Standard Colors:** Any of the 24 standard colors shown can be furnished in 70% or 50% KYNAR 500®/HYLAR 5000® or Baked Enamel. **2-Coat Mica:** Greenheck offers 9 standard 2-coat Mica colors. Other colors are available. Consult Greenheck for possible extra cost when selecting non-standard colors or special finishes.	10 Years (Consult Greenheck for availability of extended warranty)
2-coat 50% KYNAR 500®/HYLAR 5000® AAMA 2604 – Dry film thickness 1.2 mil. (AKA: Acroflur®, Acrynar®)	***"Better."*** Tough, long-lasting coating has excellent color retention and abrasive properties. Resists chalking, fading, chemical abrasion and weathering.		5 Years
Baked Enamel AAMA 2603 – Dry film thickness 0.8 mil. (AKA: Acrabond Plus®, Duracron®)	***"Good."*** Provides good adhesion and resistance to weathering, corrosion and chemical stain.		1 Year
Integral Color Anodize AA-M10C22A42 (>0.7 mil)	"Two-step" anodizing is produced by following the normal anodizing step with a second, colorfast process.	Light, Medium or Dark Bronze; Champagne; Black	5 years
Clear Anodize 215 R-1 AA-M10C22A41 (>0.7 mil)	Clear, colorless and hard oxide aluminum coating that resists weathering and chemical attack.	Clear	5 years
Clear Anodize 204 R-1 AA-M10C22A31 (0.4-0.7 mil)	Clear, colorless and hard oxide aluminum coating that resists weathering and chemical attack.	Clear	1 Year
Industrial coatings	Greenheck offers a number of industrial coatings such as Hi-Pro Polyester, Epoxy, and Permatector®. Consult a Greenheck Product Specialist for complete color and application information.		Consult Greenheck
Mill	Materials may be supplied in natural aluminum or galvanized steel finish when normal weathering is acceptable and there is no concern for color or color change.		n/a

Finishes meet or exceed AAMA 2605, AAMA 2604, and AAMA 2603 requirements. Please consult www.greenheck.com for complete information on standard and extended paint warranties. Paint finish warranties are not applicable to steel products.

GREENHECK®

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ESD-403
July 2007 Rev. 1
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Greenheck Fan Corporation reserves the right to make product changes without notice.

Dampers for Louvers L-801 and L-802. Sized to match Louvers.

GREENHECK

WD-400 SERIES

Non-Motorized Backdraft Damper
Horizontal or Vertical Mount (Intake)

Application and Design

The WD-400 series are non-motorized backdraft dampers which may be mounted either vertically for intake air or mounted horizontally to allow vertical airflow down and prevent reverse airflow. The dampers are opened by air pressure differential and closed by springs. Optional motor packs are not available.

Ratings (See page 2 for specific limitations)

Pressure: 2.0 in. wg (498 Pa) - differential pressure

Velocity: 2500 fpm (13 m/s)

Temperature: 180°F (82°C)

Standard Construction

Frame: 18 ga. (1.3mm) galvanized steel

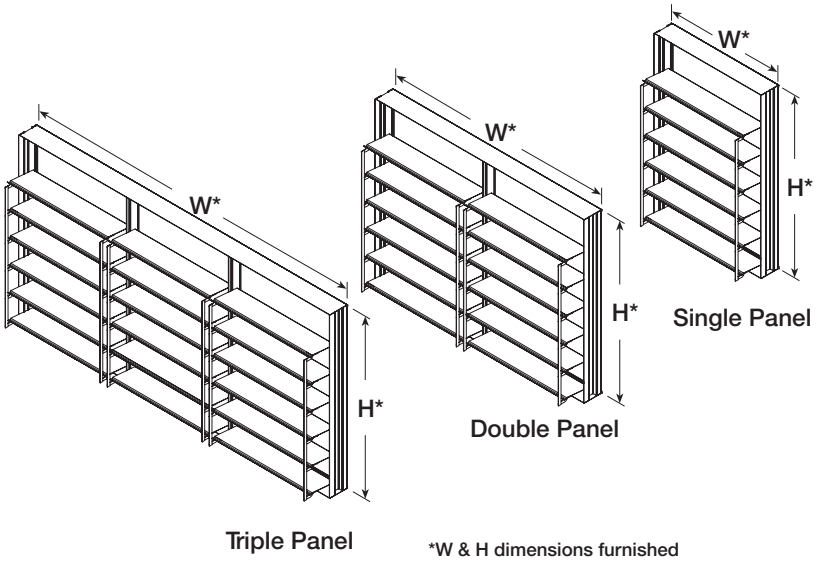
Blades: 0.025 in. (0.64mm) aluminum

Axles: 3/16 in. (4.8mm) dia. zinc plated steel rod, full length

Bearings: Synthetic (acetal)

Linkage: 0.064 in. (1.6mm) 6061T6 aluminum tie bar

Blade Seals: Vinyl



*W & H dimensions furnished approximately 1/8 in. (3mm) under size.

Size Limitations (see pages 3 & 4 for specific limitations)

Minimum Panel Size

8 in. W x 8 in. H (203mm x 203mm)

Maximum Panel Size

Single Panel: 31 in. W x 74 in. H (787mm x 1880mm)

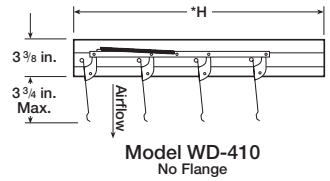
Double Panel (WD-400/410): 50 in. W x 74 in. H (1270mm x 1880mm)

Double Panel (WD-420/430): 63 in. W x 74 in. H (1600mm x 1880mm)

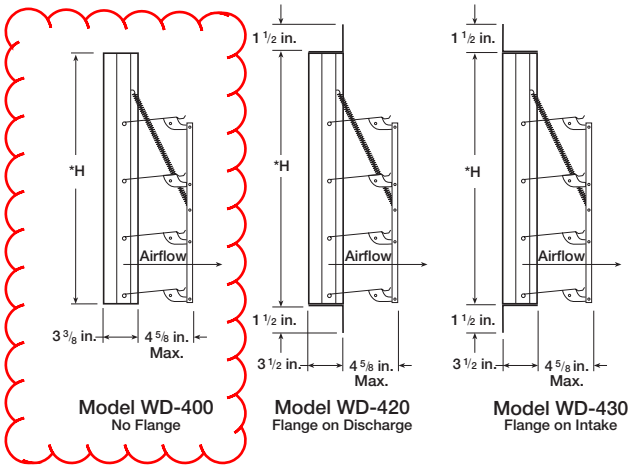
Triple Panel (WD-420/430): 74 in. W x 74 in. H (1880mm x 1880mm)

Options and Accessories (at additional cost)

- 1½ in. (38mm) flange on discharge: WD-420
- 1½ in. (38mm) flange on intake: WD-430
- Stainless Steel Axles



Model WD-410
No Flange



Pressure Drop

Performance data results from testing a 36 in. x 36 in. (914mm x 914mm) damper in accordance with AMCA Standard 500-D using Figure 5.3 for the WD-400 and Figure 5.7A for the WD-410. All data has been corrected to represent standard air at 0.075 lb/ft^3 (1.201 kg/m^3).

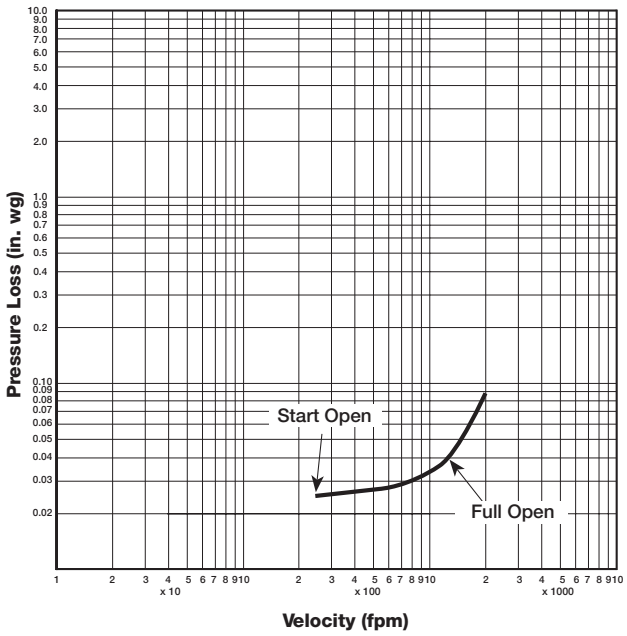
WD-400

Operational Data	ΔP in. wg (Pa)	Velocity fpm (m/s)
Blades Start to Open	0.026 (6.5)	250 (1.3)
Blades Fully Open	0.04 (10)	1200 (6.1)

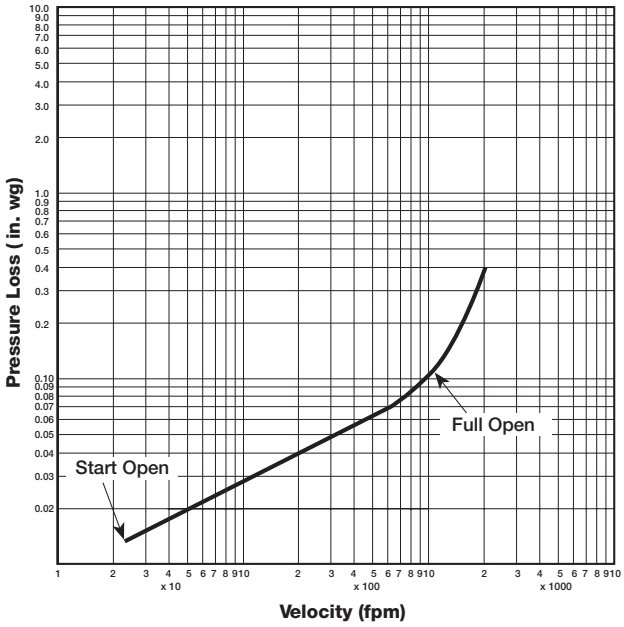
WD-410

Operational Data	ΔP in. wg (Pa)	Velocity fpm (m/s)
Blades Start to Open	0.014 (3.5)	22 (0.1)
Blades Fully Open	0.12 (30 Pa)	1000 (5.1)

Pressure Drop
36 in. x 36 in. (914mm x 914mm) Damper



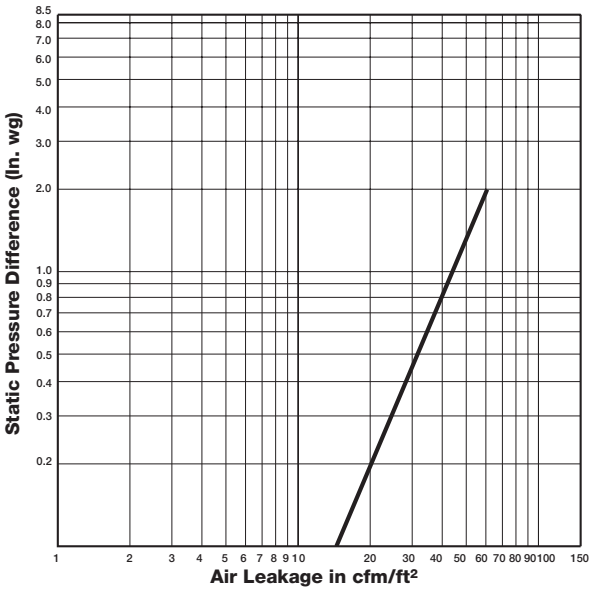
Pressure Drop
36 in. x 36 in. (914mmx 914mm) Damper



Leakage

Leakage testing was conducted in accordance with AMCA Standard 500-D and is expressed as cfm/ft^2 of damper face area. All data has been corrected to represent standard air at 0.075 lb/ft^3 (1.201 kg/m^3).

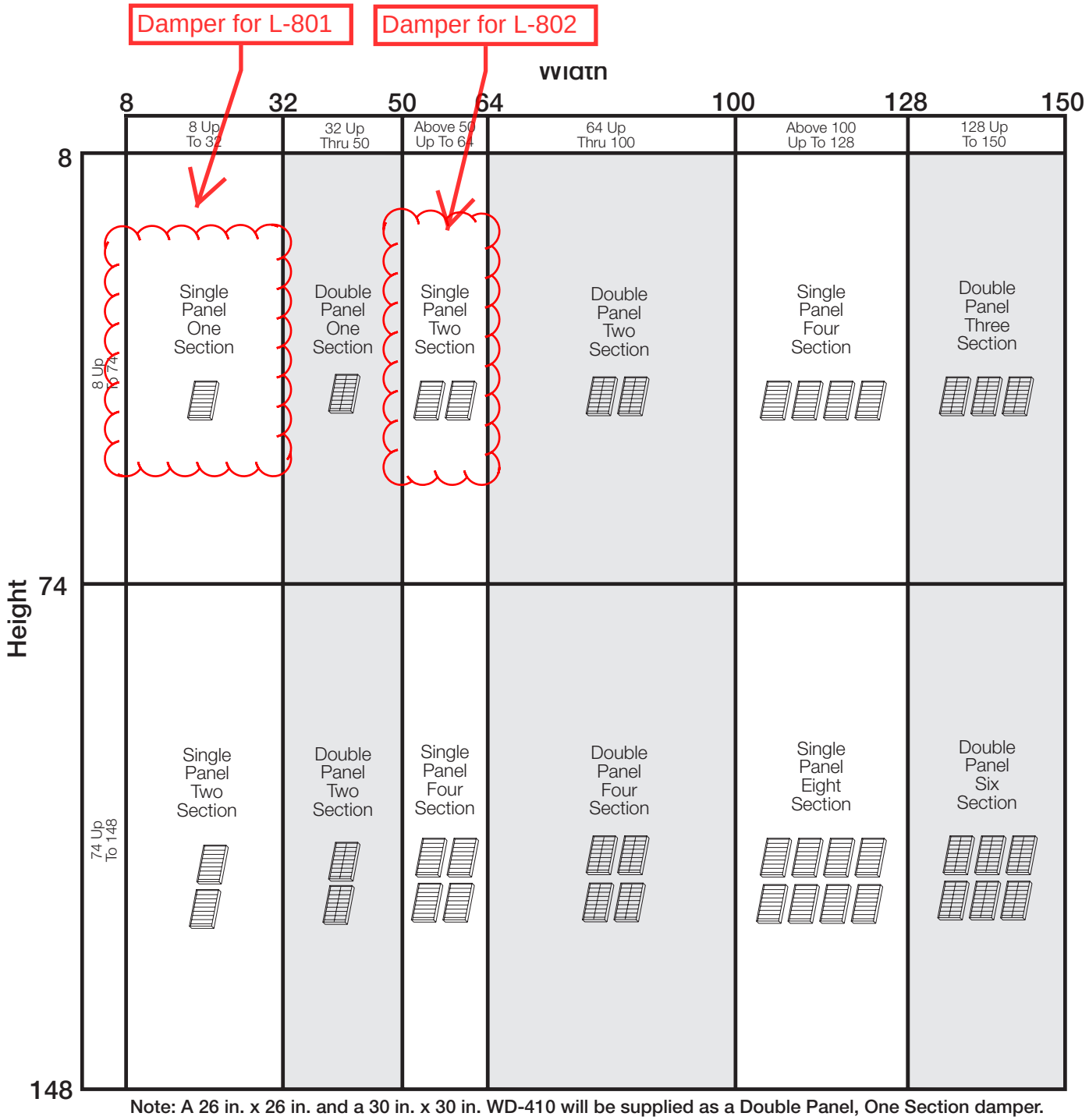
Leakage
36 in. x 36 in. (914mm x 914mm) Damper



WD-400/410 SELECTION

- Multiple section dampers shown below are supplied as equal size sections. Any damper that has multiple sections, both vertically and horizontally, will require field assembly and will require additional reinforcement (not supplied by Greenheck) to support the assembly. These larger dampers must have the additional reinforcement to give them structural stability.

- Please note that the width dimension is **always** taken as being parallel to the length of the blades.



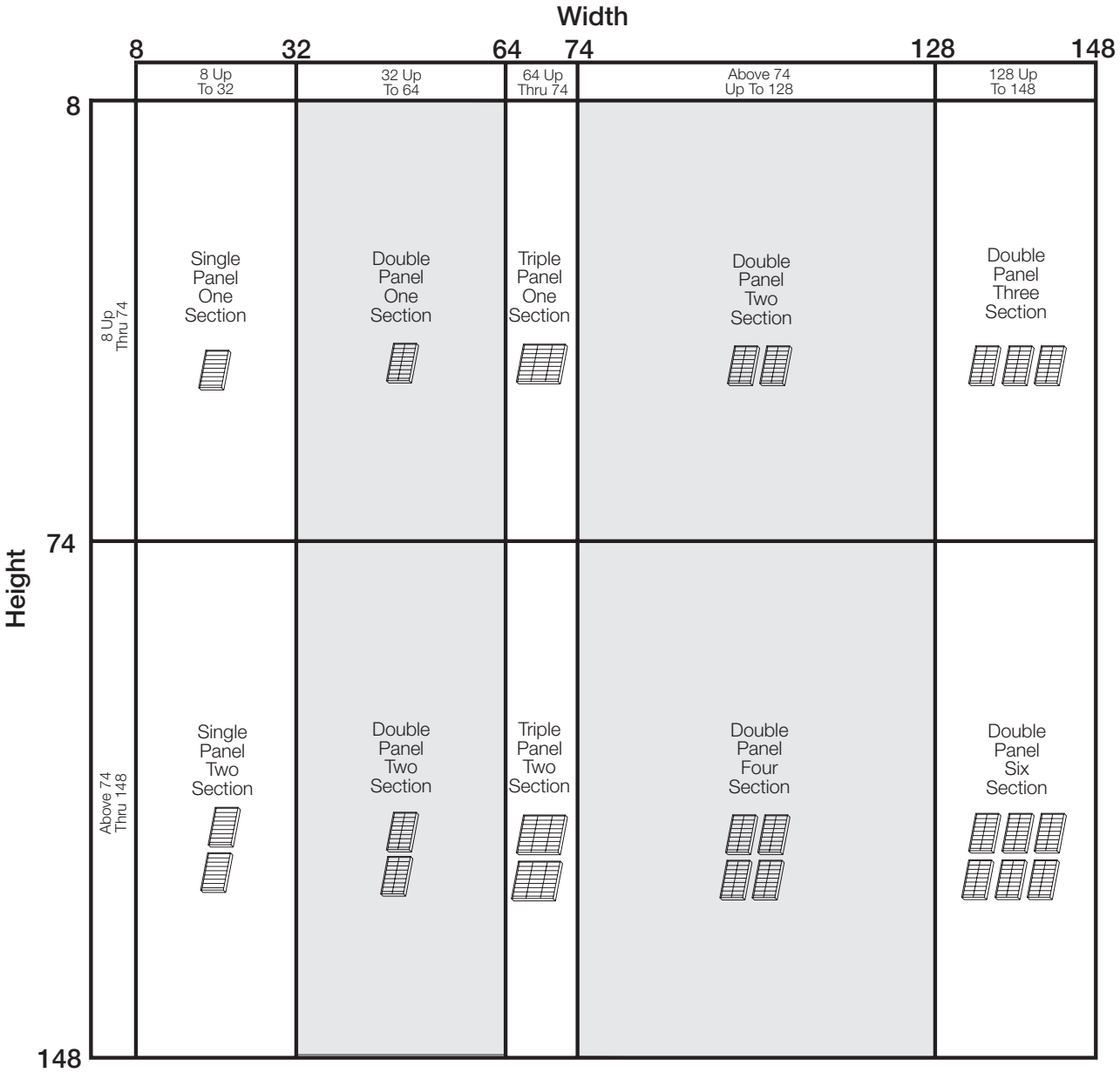
Note: A 26 in. x 26 in. and a 30 in. x 30 in. WD-410 will be supplied as a Double Panel, One Section damper.

*Width and height given in inches.

WD-420/430 SELECTION SPECIFICATIONS

- Multiple section dampers shown below are supplied as equal size sections. Any damper that has multiple sections, both vertically and horizontally, will require field assembly and <u>will</u> require additional reinforcement (not supplied by Greenheck) to support the assembly. These larger dampers <u>must</u> have the additional reinforcement to give them structural stability.

- Please note that the width dimension is **always** taken as being parallel to the length of the blades.



*Width and height given in inches.

Specifications

Backdraft dampers meeting the following specifications shall be furnished and installed where shown on plans and/or as described in schedules. Dampers shall consist of: 18 ga. (1.3mm) galvanized steel frame with 3 ½ in. (89mm) depth; blades from 0.025 in. (.64mm) roll-formed aluminum; 3/16 in. (4.8mm) dia. plated steel, full length axles turning in acetal bearings; damper shall be equipped with extruded vinyl blade seals; and internal 0.064 in. (1.6mm) aluminum tie bar (on-blade) with spring closure. Damper manufacturer's printed application and performance data including pressure, velocity and temperature limitations shall be submitted for approval showing damper suitable for pressures to 2.0 in. wg (498 Pa), velocities to 2500 fpm (13m/s) and temperatures to 180°F (82ºC). Testing and ratings to be in accordance with AMCA Standard 500-D. Basis of design is Greenheck model WD-400.

GREENHECK

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WD-400 Rev. 5 November 2005

P.O. Box 410 • Schofield, WI 54476-0410 • 715.359.6171 • greenheck.com

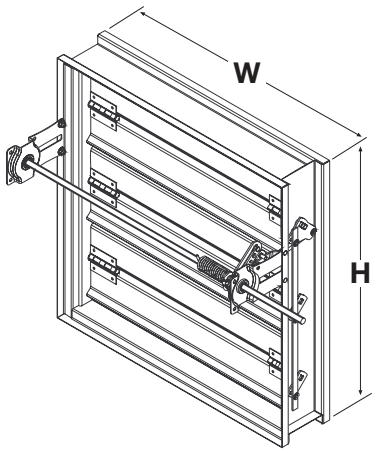
DAMPER MAINTENANCE

Application and Design

Greenheck's dampers are designed to be trouble free and hassle free under normal operation. Dampers are to be installed square and straight so as to prevent binding during operation. The following annual damper maintenance suggestions will help to insure proper damper operation and increase the life expectancy of the damper.

Foreign Matter

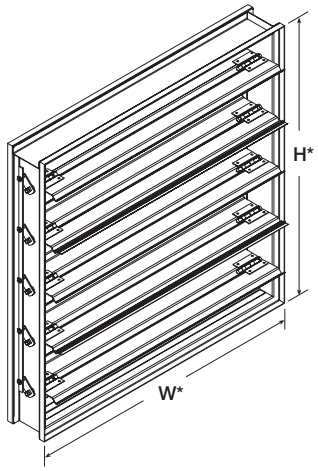
Over the course of time, dirt and grime may collect on damper surfaces. The damper surfaces should be cleaned to prevent hindrance to airflow.



Moving Parts

Make sure that parts such as linkage, bearings, blades, etc. that are intended to move freely, can do so. Lubricating these components can prevent possible rusting and unnecessary friction increase. Use only a moli-spray oil or similar graphite based oil as regular lubricating oil will attract dirt.

Bearings. Synthetic, oil impregnated, and ball bearings (without grease fittings) do not require lubrication. Ball bearings with grease fittings require only minimal grease.

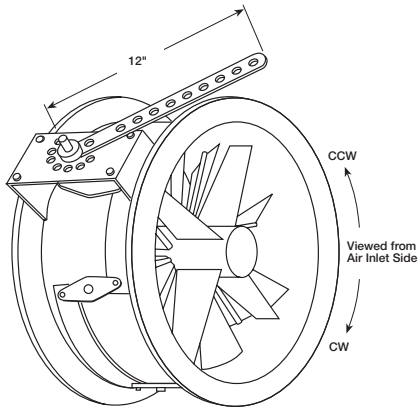


Closure

Remove foreign materials that may be interfering with blade closure or effective sealing of the blades with each other or with the frame.

Operation

While operating the damper through its full cycle, check to see that the blades open and close properly. If there is a problem, check for loose linkage, especially at the actuator. Tighten the linkage where required.



Damper Maintenance FS
Rev. 1 February 1997
Copyright © 2001 Greenheck Fan Corp.

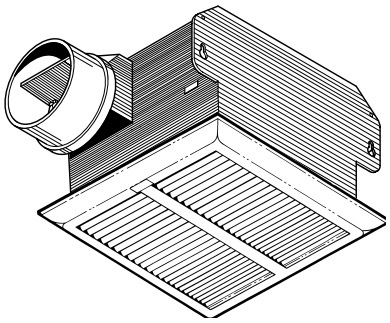
Model: **HD80**
Designation: **EF-803**

BROAN®

SPECIFICATION SHEET

MODELS HD50 & HD80

HEAVY DUTY CEILING/WALL FANS



Quiet heavy duty ceiling/wall fans built with high performance blowers, attractive metal grilles.

FEATURES

GRILLE:

- Attractive metal grille finished with white acrylic paint
- Conceals interior
- Low profile blends well with any decor
- Torsion spring grille mounting - no tools required

BLOWER:

- Plug-in, permanently lubricated, totally enclosed motor
- Centrifugal blower wheel for quiet, efficient performance
- Long life motor bearings
- Designed for continuous operation

HOUSING:

- Rugged 26-gage galvanized steel construction
- Integral key-holed mounting brackets for easy, secure installation directly to joist
- Provision for wire suspension when installed in a drop ceiling
- Tapered, polymeric duct fitting with built-in backdraft damper for easy, positive duct connection and no metallic clatter

U.L. Listed for use over bathtubs and showers when connected to a GFCI protected branch wiring.

TYPICAL SPECIFICATION

Ceiling/wall fan shall be Broan Model HD50 (HD80).

Ceiling/wall fan shall have galvanized steel housing with integral mounting brackets. Ceiling/wall fan shall have built-in backdraft damper and shall be ducted to a roof or wall cap.

Motor to be totally enclosed, permanently lubricated, and have long-life bearings designed for continuous operation. Blower assembly shall have a centrifugal blower wheel and be removable from housing.

Air delivery shall be no less and sound level no greater than valves listed in the "Performance Ratings" charts on this sheet. All air and sound ratings shall be certified by HVI and AMCA licensed.

Ceiling/wall fan shall be U.L. Listed for use over bathtubs and showers when connected to a GFCI protected branch circuit.

Ceiling/wall fan shall be Energy Star® qualified (Model HD50 only).

Broan-NuTone LLC certifies that the models shown herein are licensed to bear the AMCA Seal. The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 211 and AMCA Publication 311 and comply with the requirements of the AMCA Certified Ratings Program.

Model HD50 only

Broan-NuTone LLC Hartford, Wisconsin www.broan.com 800-558-1711

REFERENCE	QTY.	REMARKS	Project
			Location
			Architect
			Engineer
			Contractor
			Submitted by Date

PERFORMANCE RATINGS - MODELS HD50 & HD80

AMCA LICENSED PERFORMANCE

Model No.		Static Pressure (in. wg Ps)						Volts	Watts	Nominal RPM	Duct Size
		0.0	0.1	.125	.250	.375					
HD50	CFM	61	51	48	31	9		120	30	1070	4" Round
	Sones	1.9	2.2	2.3	3.0	3.3					
HD80	CFM	93	84	81	65	47		120	50	1380	4" Round
	Sones	4.0	4.1	4.1	4.3	4.6					

The performance ratings include the effects of inlet grille and backdraft damper in the airstream. Speed (RPM) shown is nominal. Performance is based on actual speed of test. The sound ratings are loudness values in fan sones at 5' (1.5m) in a hemispherical free field calculated per AMCA Std. 301. Values shown are for Installation Type B: Free inlet fan sone levels. Air performance shown is for Installation Type B: Free inlet, Ducted outlet.

SONES

Model Number	HVI Sones @ 0.1" Ps*	AMCA Sones @ 0.0" Ps*
HD50	1.5	1.9
HD80	2.5	4.0

*There is a difference between sone values certified by HVI for residential use and by AMCA for commercial/industrial use. Exact comparison of these values is not possible. This difference is mainly due to the procedures used to convert measured sound to perceived sound. ANSI S3.4, used by both HVI and AMCA, specifies a procedure for calculating loudness as perceived by a typical listener under specific conditions. HVI establishes values at a distance of 5 feet from the fan in a "spherical free field"; AMCA establishes values at a distance of 5 feet in a "hemispherical free field". HVI and AMCA have different rules for rounding sone values.

AMPS

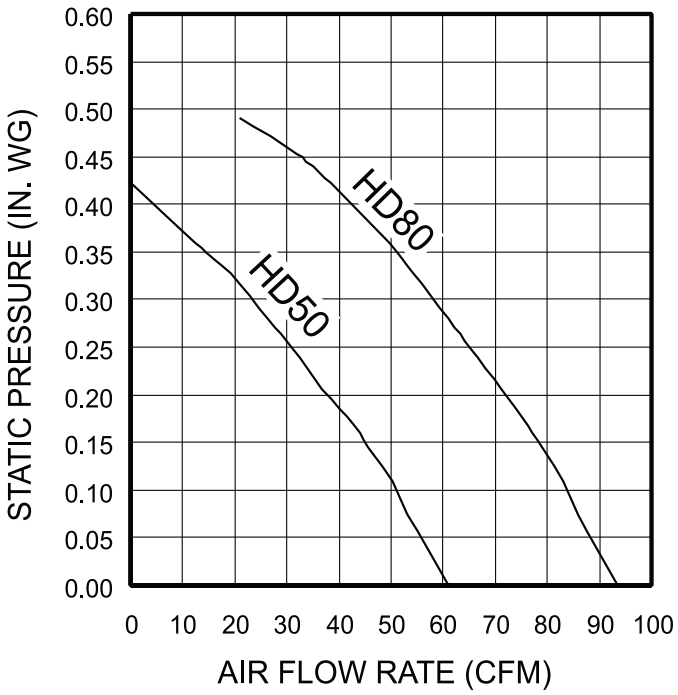
MODEL NUMBER	AMPS
HD50	0.4
HD80	0.5

Broan- NuTone LLC certifies that the models shown herein are licensed to bear the AMCA Seal. The ratings shown are based on tests and procedures performed in accordance with AMCA Publication 211 and AMCA Publication 311 and comply with the requirements of the AMCA Certified Ratings Program.

HVI PERFORMANCE

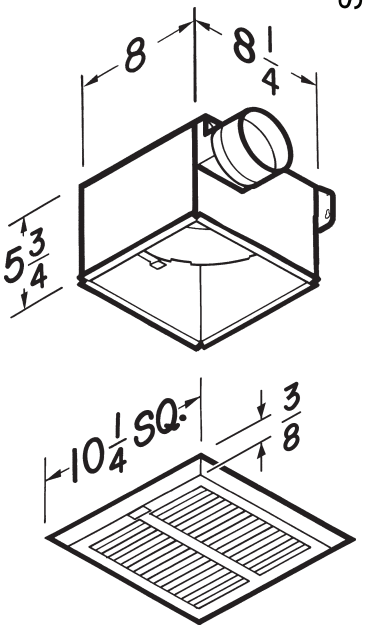
MODEL NUMBER	SONES	CFM @0.1'' Ps
HD50	1.5	50
HD80	2.5	80

HVI-2100 CERTIFIED RATINGS comply with new testing technologies and procedures prescribed by the Home Ventilating Institute, for off-the-shelf products, as they are available to consumers. Product performance is rated at 0.1 in. static pressure, based on tests conducted in a state-of-the-art test laboratory. Sones are a measure of humanly-perceived loudness, based on laboratory measurements.



WEIGHT

MODEL NO.	SHIPPING WT.
HD50	7.1 lbs.
HD80	7.2 lbs.



Model HD50 only

BROAN®

Broan-NuTone LLC Hartford, Wisconsin www.broan.com 800-558-1711

CEILING VENTILATORS/VENTILADORES DE CIELO RASO

MODELS/MODELOS HD50 • HD80

READ AND SAVE THESE INSTRUCTIONS

WARNING

TO REDUCE THE RISK OF FIRE, ELECTRIC SHOCK, OR INJURY TO PERSONS, OBSERVE THE FOLLOWING:

1. Use this unit only in the manner intended by the manufacturer. If you have questions, contact the manufacturer at the address or telephone number listed in the warranty.
2. Before servicing or cleaning unit, switch power off at service panel and lock the service disconnecting means to prevent power from being switched on accidentally. When the service disconnecting means cannot be locked, securely fasten a prominent warning device, such as a tag, to the service panel.
3. Installation work and electrical wiring must be done by a qualified person(s) in accordance with all applicable codes and standards, including fire-rated construction codes and standards.
4. Sufficient air is needed for proper combustion and exhausting of gases through the flue (chimney) of fuel burning equipment to prevent backdrafting. Follow the heating equipment manufacturer's guideline and safety standards such as those published by the National Fire Protection Association (NFPA), and the American Society for Heating, Refrigeration and Air Conditioning Engineers (ASHRAE), and the local code authorities.
5. When cutting or drilling into wall or ceiling, do not damage electrical wiring and other hidden utilities.
6. Ducted fans must always be vented to the outdoors.
7. If this unit is to be installed over a tub or shower, it must be marked as appropriate for the application and be connected to a GFCI (Ground Fault Circuit Interrupter) - protected branch circuit.
8. Never place a switch where it can be reached from a tub or shower.
9. This unit must be grounded.

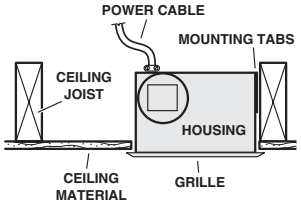
CAUTION

1. For general ventilating use only. Do not use to exhaust hazardous or explosive materials and vapors.
2. To avoid motor bearing damage and noisy and/or unbalanced impellers, keep drywall spray, construction dust, etc. off power unit.
3. Please read specification label on product for further information and requirements.

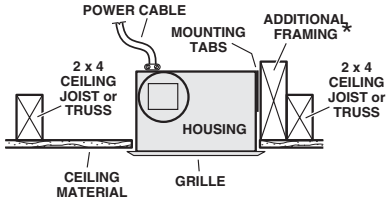
Installer: Leave this manual with the homeowner.

Homeowner: Use and Care information on page 4.

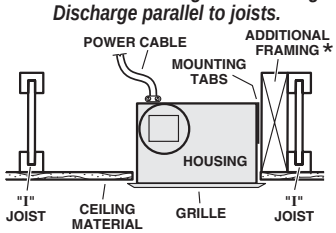
TYPICAL INSTALLATIONS



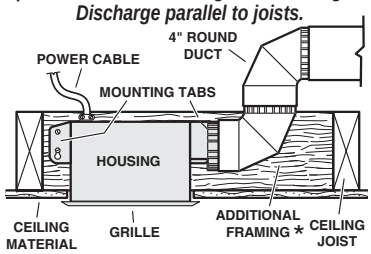
HOUSING MOUNTED DIRECTLY TO JOIST
2x6 (or larger) ***Discharge parallel to joists.***



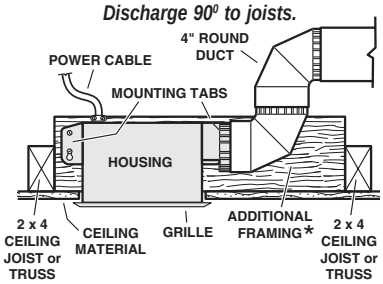
HOUSING MOUNTED TO 2x4 TRUSS
Requires additional framing for mounting tabs.
Discharge parallel to joists.



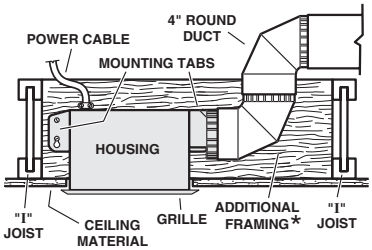
HOUSING MOUNTED TO "I" JOIST
Requires additional framing for mounting tabs.
Discharge parallel to joists.



HOUSING MOUNTED TO ADDITIONAL FRAMING
Discharge 90⁰ to joists.



HOUSING MOUNTED TO 2x4 TRUSS
Requires additional framing for mounting tabs.
Discharge 90⁰ to joists.



HOUSING MOUNTED TO "I" JOIST
Requires additional framing for mounting tabs.
Discharge 90⁰ to joists.

* Additional framing must be a 2x6 (minimum height), at least 9-inches long.

LEA Y CONSERVE ESTAS INSTRUCCIONES

ADVERTENCIA

PARA REDUCIR EL RIESGO DE INCENDIO, DESCARGA ELÉCTRICA O LESIONES PERSONALES, OBSERVE LO SIGUIENTE:

1. Utilice esta unidad solamente de acuerdo con las instrucciones del fabricante. Si tiene preguntas comuníquese con el fabricante a la dirección o al número telefónico que se indica en la garantía.
2. Antes de dar servicio o limpiar la unidad, interrumpa el suministro de energía en el panel de servicio y bloquee los dispositivos de desconexión para evitar la reinstalación accidental de la energía. Cuando no se puedan bloquear los dispositivos de desconexión, fije seguramente en el panel de servicio un medio de advertencia que sea visible, como por ejemplo una etiqueta.
3. Una persona o personas calificadas deben realizar el trabajo de instalación y el cableado eléctrico, de acuerdo con todos los códigos y normas aplicables, inclusive los códigos y normas de construcción para evitar incendios.
4. Se necesita suficiente aire para que se realice la combustión y la descarga de gases adecuadas a través de la chimenea del equipo para quemar combustible a fin de evitar las corrientes de inversión. Observe los lineamientos del fabricante del equipo de calefacción y las normas de seguridad, como por ejemplo las publicadas por la Asociación Nacional de Protección contra Incendios (National Fire Protection Association: NFPA), y la Sociedad Americana de Ingenieros en Calefacción, Refrigeración y Sistemas de Acondicionamiento de Aire (American Society for Heating, Refrigeration and Air Conditioning Engineers: ASHRAE), y los códigos locales.ditioning Engineers (ASHRAE), and the local code authorities.
5. Cuando corte o perfore la pared o el cielo raso, tenga cuidado de no dañar el cableado eléctrico ni otras conexiones de servicios que se encuentren ocultas.
6. Los ventiladores con conductos siempre deben tener salida hacia el exterior.
7. Si se va a instalar esta unidad sobre una tina o ducha, debe marcarse que es apropiada para esta aplicación y conectarse a un GFCI (interruptor accionado por pérdida de conexión a tierra) en un circuito de derivación protegido.
8. Nunca coloque el interruptor en un lugar en donde se pueda alcanzar desde la tina o ducha.
9. Esta unidad debe conectarse a tierra.

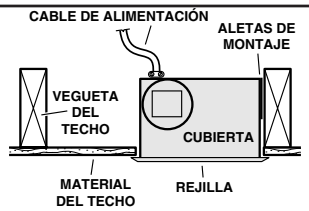
PRECAUCIÓN

1. Esta unidad debe usarse solamente para ventilación general. No la utilice para la descarga de materiales ni vapores peligrosos o explosivos.
2. Para evitar causar daño a los cojinetes del motor y pistones impulsores ruidosos y/o no balanceados, mantenga los aerosoles para pirca, el polvo de construcción, etc. lejos del motor.
3. Por favor consulte la información y los requerimientos adicionales contenidos en la etiqueta de especificaciones que se encuentra en el producto.

A la persona que realiza la instalación: Deje este manual con el dueño de la casa.

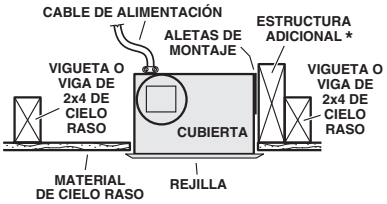
Al dueño de la casa: Las instrucciones de operación y limpieza se encuentran en la página 4.

INSTALACIONES TÍPICAS



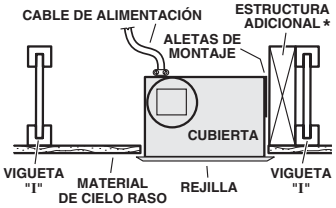
CUBIERTA MONTADA DIRECTAMENTE EN LA VIGUETA

2x6 (o más grande). ***Descarga paralela a las viguetas.***



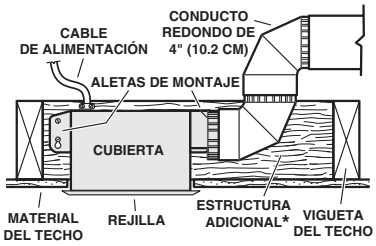
CUBIERTA MONTADA EN UNA VIGA DE 2x4

Se requiere una estructura adicional para las aletas de montaje. Descarga paralela a las viguetas.



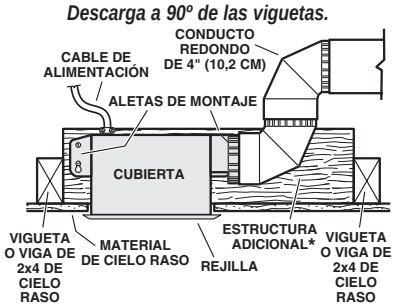
CUBIERTA MONTADA EN UNA VIGUETA "I"

Se requiere una estructura adicional para las aletas de montaje. Descarga paralela a las viguetas.



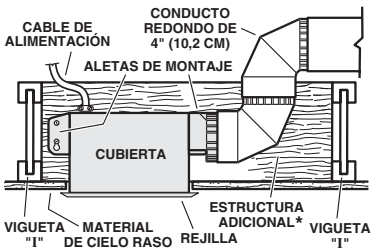
CUBIERTA MONTADA EN UNA ESTRUCTURA ADICIONAL

Descarga a 90º de las viguetas.


CONDUCTO REDONDO DE 4" (10,2 CM)
CABLE DE ALIMENTACIÓN
ALETAS DE MONTAJE
CUBIERTA
VIGUETA O VIGA DE 2x4 DE CIELO RASO
MATERIAL DE CIELO RASO
REJILLA
ESTRUCTURA ADICIONAL*
VIGUETA O VIGA DE 2x4 DE CIELO RASO

CUBIERTA MONTADA EN UNA VIGA DE 2x4

Se requiere una estructura adicional para las aletas de montaje. Descarga a 90º de las viguetas.

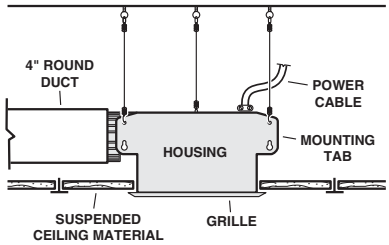


CUBIERTA MONTADA EN UNA VIGUETA "I"

Se requiere una estructura adicional para las aletas de montaje. Descarga a 90º de las viguetas.

* La estructura adicional debe ser un tramo de 2x6 (altura mínima), de al menos 9 pulgadas (23 cm) de largo.

TYPICAL INSTALLATIONS



SUSPENDED CEILINGS

Housing hung with wires - 3-point mount.

INSTALL THE HOUSING

- PLEASE NOTE -

THE FOLLOWING INSTALLATION ILLUSTRATIONS SHOW 2 X 6 JOISTS. IF YOU HAVE A TRUSS OR "I"-JOIST INSTALLATION, MOUNT THE VENTILATOR TO THE ADDITIONAL FRAMING IN THE SAME MANNER. (Additional framing must be a 2x6 (minimum height), at least 9-inches long.)

New Construction

1. Choose the location for your fan in the ceiling. For best possible performance, use the shortest possible duct run and a minimum number of elbows.
2. Position mounting brackets against joist so that bottom edge of housing will be flush with finished ceiling.

Additional positioning feature for 5/8", 1", & 1-1/4" thick ceiling material:

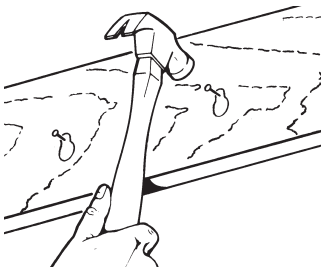
Holes in corners of housing are labeled with various ceiling material thicknesses. Position housing so bottom edge of joist is visible through a matched set of holes. The housing is now in the proper position for that ceiling material thickness.

Additional positioning feature for 1/2" thick ceiling material:

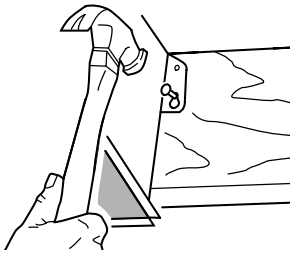
Bend two tabs, on side of housing, 90º outward. Lift housing until tabs contact underside of joist.

Mark the keyhole slot on both mounting brackets.

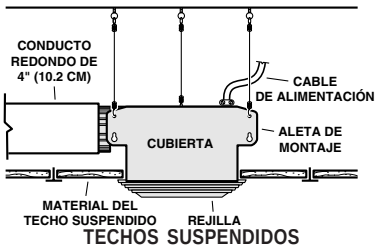
3. Set housing aside and drive nails partially into joist at the top of both keyhole marks.



4. Hang housing from nails and pound nails tight. To ensure a noise-free mount, pound another nail through the top hole of each mounting tab.



INSTALACIONES TÍPICAS



TECHOS SUSPENDIDOS

Cubierta montada con cables. Montaje de tres puntos.

INSTALACIÓN DE LA CUBIERTA

- POR FAVOR NOTE -

LAS SIGUIENTES ILUSTRACIONES DE LA INSTALACIÓN MUESTRAN VIGUETAS DE 2 X 6. SI LA INSTALACIÓN ES EN UNA VIGA O EN UNA VIGUETA EN "I", MONTE EL VENTILADOR EN LA ESTRUCTURA ADICIONAL DE LA MISMA MANERA. (La estructura adicional debe ser un tramo de 2x6 (altura mínima), de al menos 9 pulgadas (23 cm) de largo.)

Construcción nueva

1. Seleccione la ubicación del ventilador con lámpara en el cielo raso. Para obtener el mejor rendimiento posible, utilice un tramo de conductos lo más corto posible y un número mínimo de codos.
2. Coloque las abrazaderas de montaje contra la vigueta, de manera que el borde inferior de la cubierta quede al ras del cielo raso terminado.

Característica adicional para la colocación en material de cielo raso de 5/8" (1.6 cm), 1" (2.5 cm) y 1 ¼" (3.2 cm):

Los orificios que se encuentran en las esquinas de la cubierta están marcados con varios espesores del material del cielo raso. Coloque la cubierta de manera que el borde inferior de la vigueta sea visible a través del conjunto de orificios que coinciden. Ahora la cubierta se encuentra en la posición adecuada para ese espesor del material del cielo raso.

Característica adicional para la colocación en material de cielo raso de ½" (1.3 cm):

Doble a 90º y hacia afuera las dos aletas que se encuentran a los costados de la cubierta. Levante la cubierta hasta que las aletas entren en contacto con la cara inferior de la vigueta.

Marque el orificio con forma de cerradura de ambas abrazaderas de montaje.

3. Coloque la cubierta a un lado e introduzca parcialmente los clavos en la vigueta, en la parte superior de ambas marcas de los orificios en forma de cerradura.
4. Suspenda la cubierta con los clavos e introduzca los clavos completamente. Para asegurar un montaje sin ruido, coloque otro clavo en el orificio superior de cada aleta de montaje.

INSTALL THE HOUSING (continued)

Existing Construction

1. Choose the location for your fan in the ceiling. For best possible performance, use the shortest possible duct run and a minimum number of elbows.
2. In attic, position mounting brackets against joist. Trace outline of housing on ceiling material.
3. Set housing aside and cut ceiling opening slightly larger than marked.
4. Place housing in opening so that its bottom edge is flush with finished ceiling. Nail to joist through keyhole on both sides. To ensure a noise-free installation, drive another nail through the top hole of each mounting bracket.
5. Additional mounting holes are provided for installations where access from above is inconvenient or not possible. Nail or screw housing directly to joists or framing.

INSTALL THE DUCTWORK

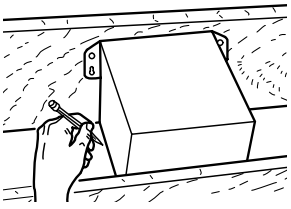
1. Snap the damper/duct connector onto housing. Make sure that tabs on the connector lock into slots in housing. Top of damper/duct connector should be flush with top of housing.
2. Connect 4" round duct to damper/duct connector and extend duct to outside through a roof or wall cap. Check damper to make sure that it opens freely. Tape all duct connections to make them secure and air tight.

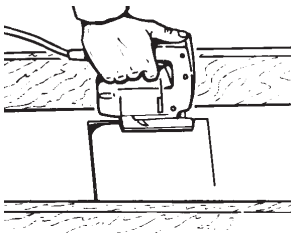
CONNECT THE WIRING

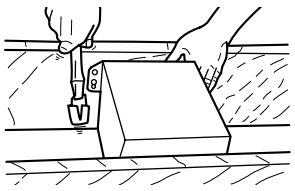
1. Wire unit following diagram. Run electrical cable as direct as possible to unit. Do not allow cable to touch sides or top of unit after installation is complete.

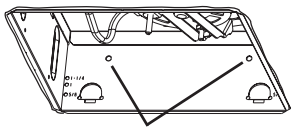
ATTACH THE GRILLE

1. Squeeze grille springs together and insert springs into slots in motor plate.
2. Push grille up against ceiling.

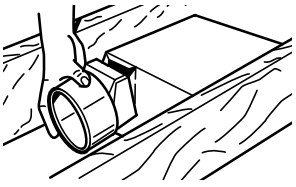


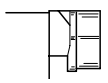


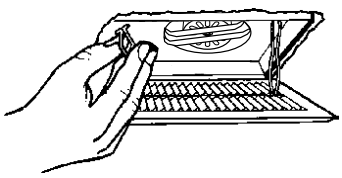


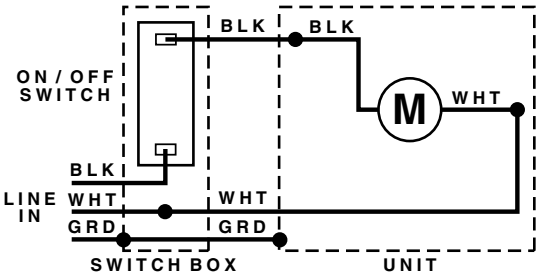


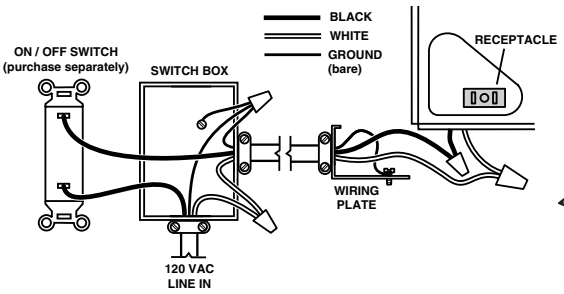
ADDITIONAL MOUNTING HOLES
ORIFICIOS DE MONTAJE ADICIONALES

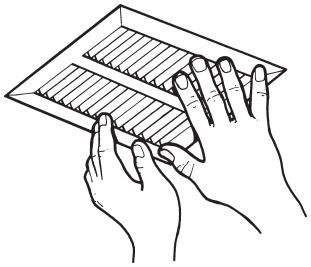












INSTALACIÓN DE LA CUBIERTA (continuación)

Construcción existente

1. Seleccione la ubicación del ventilador en el cielo raso. Para obtener el mejor rendimiento posible, utilice un tramo de conductos lo más corto posible y un número mínimo de codos.
2. En el entretecho, coloque las abrazaderas de montaje contra la vigueta. Trace el perímetro de la cubierta en el material del techo.
3. Coloque la cubierta a un lado y haga una abertura en el techo ligeramente más grande que el perímetro marcado.
4. Coloque la cubierta en la abertura de manera que su borde inferior quede al ras del cielo raso terminado. Clave la cubierta en la vigueta a través del orificio en forma de cerradura, en ambos lados. Para asegurar un montaje sin ruido, coloque otro clavo en el orificio superior de cada aleta de montaje.
5. En la cubierta se pueden encontrar orificios de montaje adicionales para aquellas instalaciones en las que es inconveniente o imposible el acceso desde arriba. Clave o atornille la cubierta directamente en las viguetas o el armazón.

INSTALACIÓN DEL SISTEMA DE CONDUCTOS

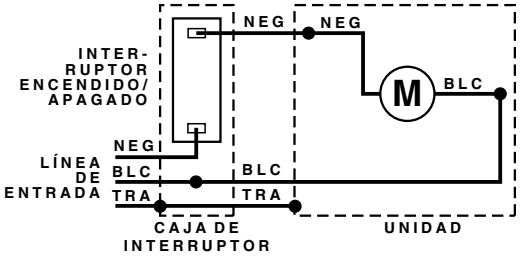
1. Conecte a presión el conector del regulador de tiro/conducto en la cubierta. Asegúrese de que las aletas del conector queden fijas en las ranuras de la cubierta. La parte superior del conector del regulador de tiro/conducto debe quedar al ras de la parte superior de la cubierta.
2. Conecte el conducto redondo de 4" (10.2 cm) en el conector del regulador de tiro/conducto y extienda el conducto hasta el exterior a través de una tapa de techo o de pared. Revise el regulador de tiro para asegurarse de que abre libremente. Coloque cinta en todas las conexiones de los conductos para asegurarlas y hacerlas herméticas

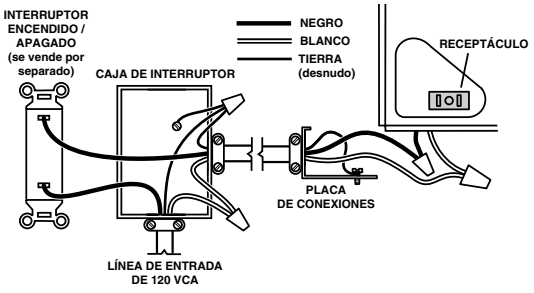
CONEXIÓN ELÉCTRICA

1. Conecte la unidad con este diagrama. Extienda el cable eléctrico a la unidad tan directamente como sea posible. No permita que el cable toque los costados ni la parte superior de la unidad después de que la instalación esté terminada.

CONEXIÓN DE LA REJILLA

1. Apriete los resortes de la rejilla y métalos en la place del motor.
2. Presione la rejilla contra el cielo raso.





USE AND CARE

WARNING: DISCONNECT ELECTRICAL POWER SUPPLY AND LOCK OUT SERVICE PANEL BEFORE CLEANING OR SERVICING THIS UNIT.

MOTOR LUBRICATION

The motor is permanently lubricated. Do not oil or disassemble motor.

CLEANING

TO CLEAN GRILLE:

CAUTION: Grille can be cleaned with mild, soapy water (use a mild detergent, such as dishwashing liquid) and dried with a soft cloth. Do not use abrasive cloth, steel wool pads, or scouring powders.

TO CLEAN FAN ASSEMBLY:

Unplug fan assembly. To remove motor plate: Find the single tab on the motor plate (located next to the receptacle). Push up near motor plate tab while pushing out on side of housing. Or insert a straight-blade screwdriver into slot in housing (next to tab) and twist screwdriver. Gently vacuum fan, motor and interior of housing. METAL AND ELECTRICAL PARTS SHOULD NEVER BE IMMERSED IN WATER.

SERVICE PARTS/PIEZAS DE SERVICIO

KEY Nº. CLAVE	PART NO. Nº.PIEZA	DESCRIPTION/DESCRIPCIÓN
1	97011308	Grille/Rejilla
2	97014926	Motor Plate/Placa del motor
3	99080519	Motor (HD50)
	99080520	Motor (HD80)
4	99020276	Impeller/Pistón impulsor
5	99260425	Motor Nut (2 req.)/Tuerca del motor (se req. 2)
*	97015161	Blower Assembly (HD50) (includes Key Nos. 2 thru 5) Conjunto del ventilador (HD50) (incluye Clave Nos. 2 de a 5)
*	97015162	Blower Assembly (HD80) (includes Key Nos. 2 thru 5) Conjunto del ventilador (HD80) (incluye Clave Nos. 2 de a 5)
6	99270982	Receptacle/Receptáculo
7	98009611	Wire Panel/Panel del cableado
*	97015170	Wire Panel Assembly (includes Key Nos. 6 & 7)/ Conjunto del panel de cableado (incluye Clave No. 6 & 7)
8	97014922	Housing/Cubierta
9	97003932	Damper/Duct Connector/Conector del regulador de tiro/conducto
10	98008868	Wiring Plate/Placa de conexiones
11	99150575	Screw, #8-18 x .375/Tornillo, #8-18 x .375
12	99150471	Ground Screw/Tornillo de la tierra

* Not shown assembled.
Order replacement parts by "PART NO." - not by "KEY NO."

* No ilustrado ensamblado.
Pida piezas de servicio dando como referencia el Nº. DE PIEZA, no el Nº. DE CLAVE.

INSTRUCCIONES DE OPERACIÓN Y LIMPIEZA

ADVERTENCIA: ANTES DE LIMPIAR O DAR SERVICIO ESTA UNIDAD, DESCONECTE EL SUMINISTRO DE ENERGÍA Y BLOQUEE EL PANEL DE SERVICIO .

LUBRICACIÓN DEL MOTOR

El motor está permanentemente lubricado. No lubrique ni desmonte el motor.

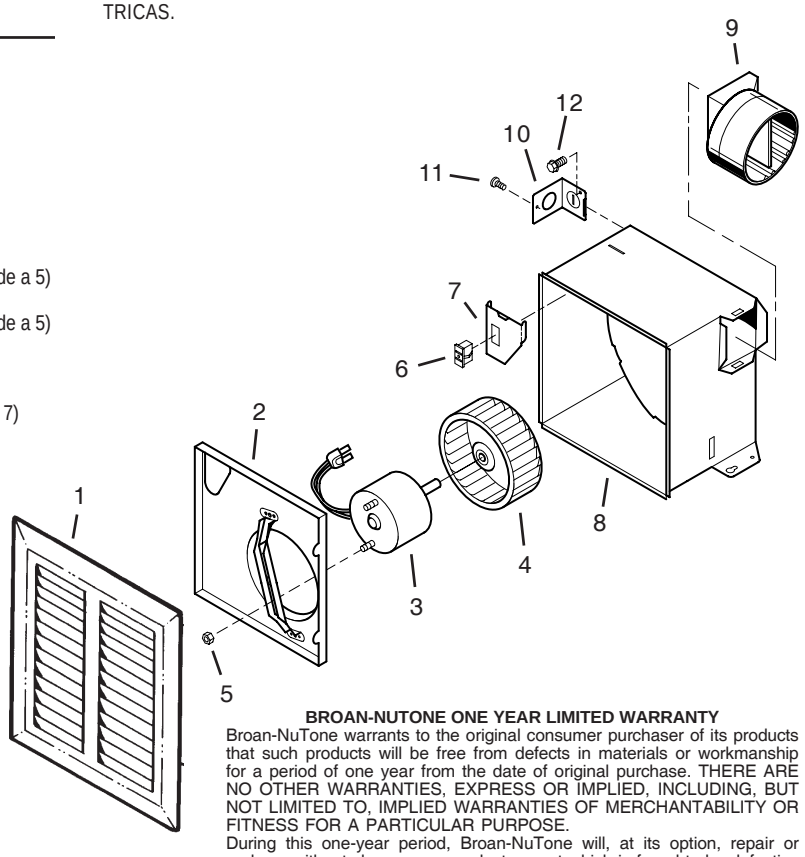
LIMPIEZA

PARA LIMPIAR LA REJILLA:

PRECAUCIÓN: La rejilla se pueden limpiar con una solución suave de agua y jabón (use un detergente suave, como por ejemplo líquido para lavar vajilla) y séquelas con un paño suave. No use tela abrasiva, almohadillas de estropajo de acero ni polvos desengrasadores.

PARA LIMPIAR EL CONJUNTO DEL VENTILADOR:

Desenchufe el conjunto del ventilador. Para quitar la placa del motor: Localice la aleta de la placa del motor (se encuentra junto a el receptáculo). Empuje hacia arriba la aleta de la placa del motor mientras empuja hacia afuera el costado de la cubierta. O bien, introduzca un destornillador de punta recta en la ranura de la cubierta (junto a la aleta) y haga girar el destornillador. Con una aspiradora limpie suavemente el ventilador, e motor y el interior de la cubierta. NUNCA DEBE SUMERGIR EN AGUA LAS PIEZAS METÁLICAS NI LAS ELÉCTRICAS.



GARANTIA BROAN-NUTONE LIMITADA POR UN AÑO

Broan-NuTone garantiza al consumidor comprador original de sus productos que dichos productos carecerán de defectos en materiales o en mano de obra por un período de un año a partir de la fecha original de compra. NO EXISTEN OTRAS GARANTIAS, EXPLICITAS O IMPLICITAS, INCLUYENDO, PERO NO LIMITADAS A, GARANTIAS IMPLICITAS DE COMERCIALIZACION O APTITUD PARA UN PROPOSITO PARTICULAR.

Durante el período de un año, y a su propio criterio, Broan-NuTone reparará o reemplazará, sin costo alguno cualquier producto o pieza que se encuentre defectuosa bajo condiciones normales de servicio y uso.

ESTA GARANTIA NO SE APLICA A TUBOS Y ARRANCADORES DE LAMPARAS

FLUORESCENTES. Esta garantía no cubre (a) mantenimiento y servicio normales o (b) cualquier producto o piezas que hayan sido utilizadas de forma errónea, negligente, que hayan causado un accidente, o que hayan sido reparadas o mantenidas inapropiadamente (por otras compañías que no sean Broan-NuTone), instalación defectuosa, o instalación contraria a las instrucciones de instalación recomendadas.

La duración de cualquier garantía implícita se limita a un período de un año como se especifica en la garantía expresa. Algunos estados no permiten limitaciones en cuanto al tiempo de expiración de una garantía implícita, por lo que la limitación antes mencionada puede no aplicarse a usted.

LA OBLIGACION DE BROAN-NUTONE DE REPARAR O REEMPLAZAR, SIGUIENDO EL CRITERIO DE BROAN-NUTONE, DEBERA SER EL UNICO Y EXCLUSIVO RECURSO LEGAL DEL COMPRADOR BAJO ESTA GARANTIA. BROAN-NUTONE NO SERA RESPONSABLE POR DAÑOS INCIDENTALES, CONSIGUIENTES, O POR DAÑOS ESPECIALES QUE SURJAN A RAIZ DEL USO O DESEMPEÑO DEL PRODUCTO. Algunos estados no permiten la exclusión o limitación de daños incidentales o consiguientes, por lo que la limitación antes mencionada puede no aplicarse a usted.

Esta garantía le proporciona derechos legales específicos, y usted puede también tener otros derechos, los cuales varían de estado a estado. Esta garantía reemplaza todas las garantías anteriores.

Para calificar en la garantía de servicio, usted debe (a) notificar a Broan-NuTone al domicilio que se menciona abajo o al teléfono:1-800-637-1453, (b) dar el número del modelo y la identificación de la pieza, y (c) describir la naturaleza de cualquier defecto en el producto o pieza. En el momento de solicitar servicio cubierto por la garantía, usted debe de presentar evidencia de la fecha original de compra.

Broan-NuTone LLC, 926 West State Street Hartford, WI 53027 (1-800-637-1453)

BROAN-NUTONE ONE YEAR LIMITED WARRANTY

Broan-NuTone warrants to the original consumer purchaser of its products that such products will be free from defects in materials or workmanship for a period of one year from the date of original purchase. THERE ARE NO OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

During this one-year period, Broan-NuTone will, at its option, repair or replace, without charge, any product or part which is found to be defective under normal use and service.

THIS WARRANTY DOES NOT EXTEND TO FLUORESCENT LAMP STARTERS AND TUBES. This warranty does not cover (a) normal maintenance and service or (b) any products or parts which have been subject to misuse, negligence, accident, improper maintenance or repair (other than by Broan-NuTone), faulty installation or installation contrary to recommended installation instructions.

The duration of any implied warranty is limited to the one-year period as specified for the express warranty. Some states do not allow limitation on how long an implied warranty lasts, so the above limitation may not apply to you.

BROAN-NUTONE'S OBLIGATION TO REPAIR OR REPLACE, AT BROAN-NUTONE'S OPTION, SHALL BE THE PURCHASER'S SOLE AND EXCLUSIVE REMEDY UNDER THIS WARRANTY. BROAN-NUTONE SHALL NOT BE LIABLE FOR INCIDENTAL, CONSEQUENTIAL OR SPECIAL DAMAGES ARISING OUT OF OR IN CONNECTION WITH PRODUCT USE OR PERFORMANCE. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

This warranty gives you specific legal rights, and you may also have other rights, which vary from state to state. This warranty supersedes all prior warranties.

To qualify for warranty service, you must (a) notify Broan-NuTone at the address stated below or telephone: 1-800-637-1453, (b) give the model number and part identification and (c) describe the nature of any defect in the product or part. At the time of requesting warranty service, you must present evidence of the original purchase date.

Broan-NuTone LLC, 926 West State Street, Hartford, WI 53027 (1800-637-1453)

99042899D

Model: **SL-1215**
Designation: **UH-803**

king

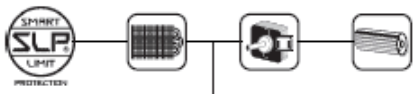
Phone: 206.762.0400

WALL HEATER

SL SERIES

SLIM LINE

PIC-A-WATT - FAN FORCED



FEATURES:

- Smart Limit Protection®
- Pic-A-Watt® Element
- C-Frame Motor
- Squirrel Cage Blower
- Surface Mount
- Multiple Wattage
- 20 Gauge Powder Coated Grill with contemporary die formed round corners.
- Standard Color - Bright White
- Bi-Metallic Limit trips and automatically resets or is manually reset by the thermostat
- Optional 1-Pole or 2-Pole unit mount thermostat 45°-80°F

The Slim Line heater was specifically designed as an easy replacement for baseboard heaters. This is acheived by using a slim surface mounted wall can that can be mounted down at floor level, unlike all other fan heaters that are required to be installed at least 4" above the floor.

The Pic-A-Watt® feature easily allows adjustment to the proper baseboard replacement size. For example: 2ft = 500W, 3ft = 750W, 4ft = 1000W, 5ft = 1250W, 6ft = 1500W, 8ft = 1750W, and 10ft = 2250W. Same quiet design as the PAW heater in an easy to install package. Just remove the old baseboard and wall mount the Slim Line heater. Use a wall thermostat or built-in thermostat kit.

ENGINEERING SPECIFICATIONS:

Contractor shall supply and install, SL-series wall surface mounted forced-air electric heaters, manufactured by King Electrical Mfg. Company, of the wattage and voltage as indicated on the plans.

Ratings: Heaters shall be available in wattages of 250 to 2,250, at 120, 208, 240, or 277 volts. The heater shall be approved for surface mounting with zero clearance from the floor.

Blower and Motor: A tangential cylindrical blower, delivering 65 CFM, shall be driven by a shaded pole, permanently lubricated, C-frame type motor with impedance protection and sealed bearings. Motors shall be the same voltage as the heater.

Elements: Elements assemblies shall be non-glowing design. Element assemblies shall consisting of three steel sheathed heating tubes in a furnace brazed, plate finned, block design. Each sheathed tube shall contain coiled Ni-Chrome wire, embedded in an insulator of magnesium oxide. The element assembly shall provide a minimum of seven (7) possible wattage configurations available for selection during field installation. The use of external resistors, diodes, or other weak links to obtain multiple wattages will not be acceptable.

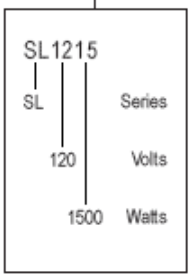
Thermal Overload: Heaters shall be equipped with thermal overload protection, which disconnects elements in the event normal operating temperatures are exceeded. The thermal overload protection device shall automatically reset when normal operating temperatures are reached or manually reset by the thermostat.

Surface Can: The surface can shall be 20 gauge electro-galvanized steel and shall contain a minimum of three (3) knockouts through which power leads are brought. The surface can shall be epoxy powder coated, and contain a stranded grounding wire. Minimum Clearance to Floors and Sidewalls.

Grill: The grill shall be louvered, one piece design with rounded edges on all four sides, with rounded comers to prevent snags from contact with other materials. The grill shall be epoxy powder coated in the color specified on the plans.

Approval: Heaters shall be listed and approved by a nationally recognized testing laboratory to UL standards.

MODEL CODE:



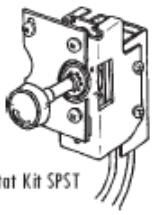
Standard Color: Bright White

SELECTION:

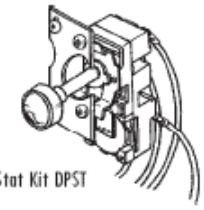
WATTAGE	120V		208V		240V		WEIGHT (lbs)
	MODEL	UPC #093319 PART NO.	MODEL	UPC #093319 PART NO.	MODEL	UPC #093319 PART NO.	
250-500-750-1000-1250-1500	SL1215	19550					11
500-750-1000-1250-1500-1750-2250			SL2022	19555	SL2422	19560	

ACCESSORIES:

MODEL	DESCRIPTION	UPC #093319 PART NO.	WEIGHT
SLT-1	Stat Kit SPST	19562	.5
SLT-2	Stat Kit DPST	19564	.5

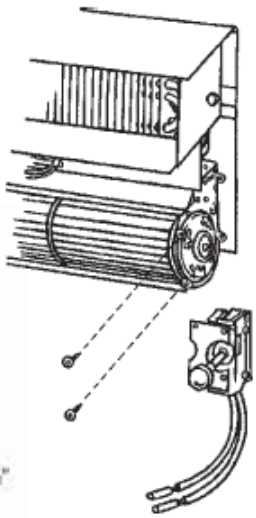


SLT-1 - Stat Kit SPST

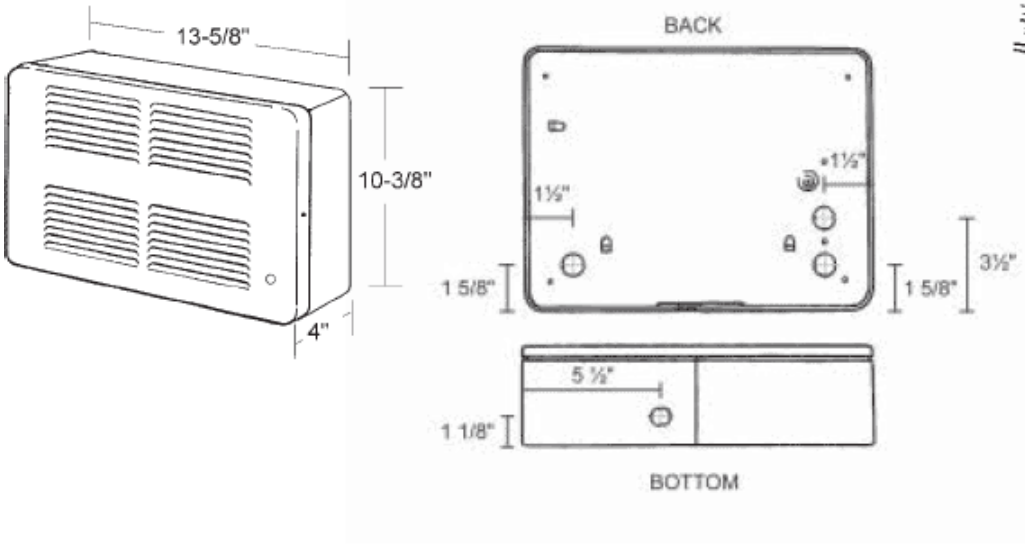


SLT-2 - Stat Kit DPST

SL Thermostat Kit Location



DIMENSIONS



Download/Print PDF Brochure for this product
SL 28-29.pdf

INSTALLATION INSTRUCTIONS

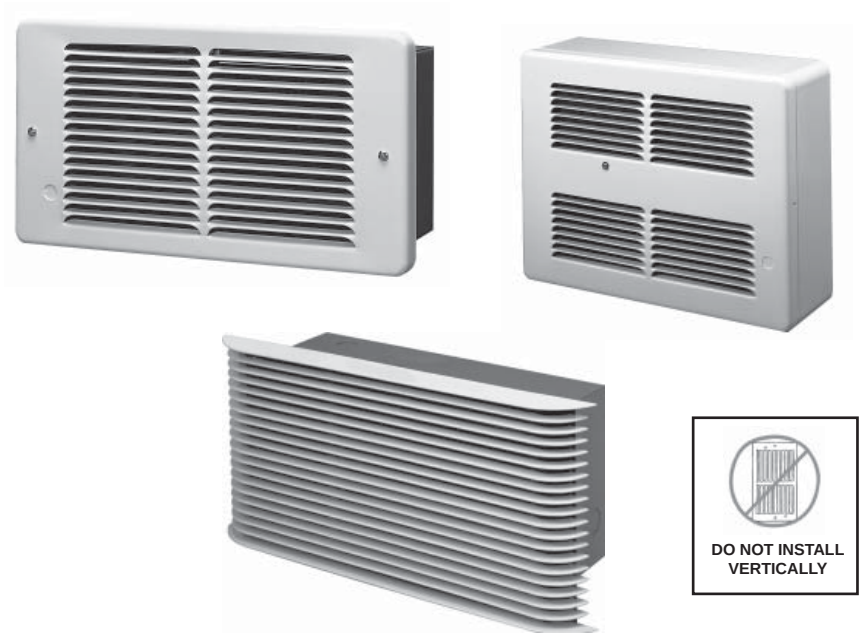
king

SMART LIMIT PROTECTION®

PAW - DEC - SL SERIES

Wall Heaters

Models: 1215 (120V) 2022 (208V)
2422 (240V) 2720 (277V)



DANGER

ELECTRIC SHOCK OR FIRE HAZARD

READ ALL WIRE SIZING, VOLTAGE REQUIREMENTS AND SAFETY DATA TO AVOID PROPERTY DAMAGE AND PERSONAL INJURY

DO NOT INSTALL VERTICALLY

WARNING

It is *extremely important* to verify the electrical power supply is the same voltage as the heater being installed. ***240 and 120 Volt heaters are not interchangeable.*** Powering a 208/240/277 Volt unit with 120 Volt supply wires will reduce heater output by approximately 75%. Powering a 120 Volt unit with 208/240/277 Volt supply wires will destroy the heater and voids all guarantees and warranties.

CAUTION: Keep electrical cords, drapery, furnishings and other combustibles at least 3 feet (.9m) from front of the heater and away from side and rear. Do not block the heater in any manner. To insure proper operation of this heater it should be a minimum of 4 inches above the floor (zero clearance to floor for SL Slimline series only) and no closer than 6 inches to the open edge of a door and/or adjacent wall. Never paint the heater grill.

WARNINGS: Turn off the power source supplying the heater before attempting any installation, maintenance or repairs. Lock or tag circuit breaker/fuse panel door. Failure to do so could result in serious electrical shock, burns or possible death.

MAINTENANCE & WARRANTY

The superior quality and design of this heater will provide years of trouble-free performance. Each year the heater should be checked and cleaned for lint and/or dust accumulation. King recommends using a soft bristle brush and vacuum to knock off contaminates. The motor is permanently lubricated and requires no oiling.

PAW Wall Heaters and SL Slim Line Wall Heaters carry a five (5) year warranty on the elements and a two (2) year warranty on components from date of installation. The DEC Wall Heater carries a ten (10) year warranty on the motor and element from date of installation. This warranty requires that the owner or his agent install the equipment in accordance with the National Electrical Code, any other applicable heating or electrical codes, and the manufacturer's installation instructions. It further requires that reasonable and necessary maintenance be performed on the unit. Failure to properly maintain the unit will result in the warranty being voided. The company is not liable for abuse or misuse of product as may be finally determined by the company. The customer shall be responsible for all costs incurred in the removal or reinstallation of products, including labor costs and shipping costs incurred to return products to King Manufacturing. King Manufacturing will repair or replace, at our option, at no charge to the customer with return freight paid by King. King Manufacturing shall not be liable for consequential damages arising with respect to the product, whether based upon negligence, tort, strict liability or contract. No other written or oral warranty applies, nor any warranties by representatives, dealers, employees of King, or any other person. All returns require a King Return Goods Authorization (RGA); Unauthorized returns will be refused. Do not return malfunctioning/defective products to store.

Operating voltage cannot exceed 5% of rated voltage. Operating heater above listed voltage ratings voids all guarantees and warranties.

KING ELECTRICAL MFG. COMPANY · 9131 10TH AVENUE SOUTH · SEATTLE, WA 98108 · PH: 206.762.0400 · FAX: 206.763.7738 · www.king-electric.com

INSTALLATION INSTRUCTIONS

INSTALLATION

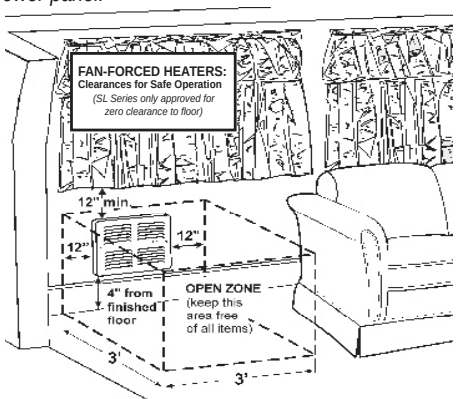
Following are installation guidelines:
- Disconnect power at main panel.
- Make certain all wiring is in accordance with any/all local codes.
- Ensure units are properly grounded.
- Heater voltage rating should be the same as supply load.

1. Remove two screws on front grille. Remove grille. Loosen mounting screw. Remove fan heater assembly.
2. Remove a 7/8" knockout. Thread supply wire into wallbox. Use an approved strain relief bushing to prevent chafing of supply wires through the opening in wallbox.
3. Install wall can a minimum of 6" from vertical sidewalls and 4" above floor (zero clearance to floor for SL series). The front edge of wall can must be ½" beyond finished wall.
4. Secure wallbox to the 2x4 studs using the two (2) holes on each side of wallbox. Secure twist lock to wall stud on opposite side.
5. Select heater wattage *(see diagram)*. King recommends the installer indicate the selected heater wattage by circling the wattage listed on the nameplate. To prevent the heater from being rewired to a higher wattage, cut the push-on ¼" female terminal off the disconnected wire (orange, blue or yellow). Tape all exposed wires. By disabling the heater in this manner there is no need to size the circuit beyond the actual connected load. (For future flexibility to increase wattage, size circuit for the maximum 2250 Watts per heater for 208/240 Volt , 1500 Watts per heater for 120 Volt).
6. Reinstall heater assembly at top of wallbox with mounting screw. Connect supply and ground wires. *(see diagram)*
7. Reinstall grille securely with screws provided. *For proper air circulation, the top louver in grille must open into and between wall can and top of heater.*

FIELD WIRING – 120/277 VOLT:
1. Connect power supply L1 (white neutral wire) to white heater wire.
2. Connect power supply L2 (black hot lead) to black heater wire.
3. Connect groundwire to green wire on wall can.

FIELD WIRING – 208/240 VOLT:
1. Connect power supply L1 (hot lead) to a black heater wire.
2. Connect power supply L2 (hot lead) to a black heater wire.
3. Connect groundwire to green wire on wall can.

NOTE: *The two black leads on the heater can be connected to either hot lead. There is no polarity. The 208/240 Volt heater does not require a neutral wire from the power panel.*



NOTE: SL Slimline Series only is zero clearance to floor

CAUTION
The heater should not be covered or blocked in any manner.

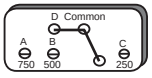
WIRING DIAGRAM

WATTAGE SELECTION
The heater is factory wired to 1500 Watts at 120 Volts. To reduce wattage unplug an insulated push on terminal per color coding below. Wrap with electrical tape to prevent possibility of electrical contact with other parts.

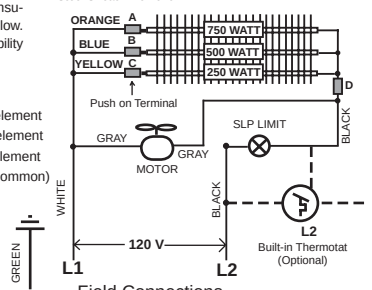
PIC-A-WATT Steel Sheath Element **1215** 120V 1500W

WIRE COLOR CODING
- **A Orange** Disconnects the 750 Watt element
- **B Blue** Disconnects the 500 Watt element
- **C Yellow** Disconnects the 250 Watt element
- **D Black** DO NOT DISCONNECT (Common)

END VIEW OF ELEMENT



A - 750 W **B** - 500 W **C** - 250 W
D - Common Leg of Power Supply

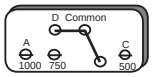


WATTAGE SELECTION
The heater is factory wired to 2250 Watts at 208/240 Volts. To reduce wattage unplug an insulated push on terminal per the color coding below. Wrap with electrical tape to prevent the possibility of electrical contact with other parts.

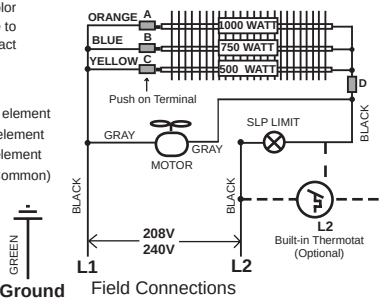
PIC-A-WATT Steel Sheath Element **2022** 208V 2250W **2422** 240V 2250W

WIRE COLOR CODING
- **A Orange** Disconnects the 1000 Watt element
- **B Blue** Disconnects the 750 Watt element
- **C Yellow** Disconnects the 500 Watt element
- **D Black** DO NOT DISCONNECT (Common)

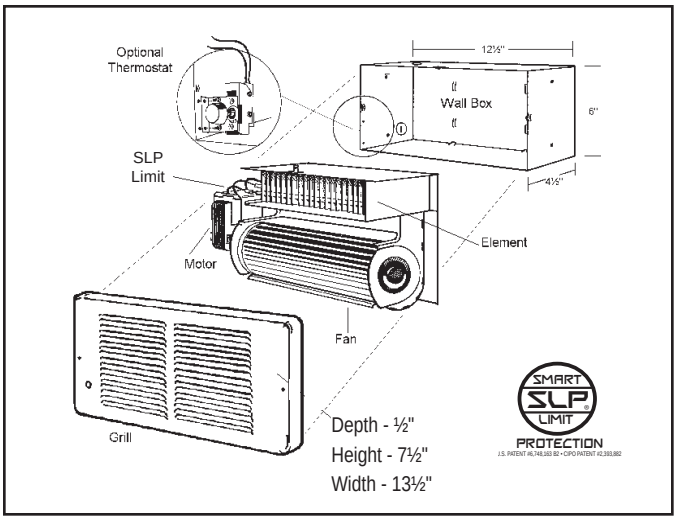
END VIEW OF ELEMENT



A - 1000 W **B** - 750 W **C** - 500 W
D - Common Leg of Power Supply



EXPLODED VIEW



This heater includes a manual reset SLP thermal protector with a self-hold feature. If the heater shuts off in the on position and the room temperature is below the highest thermostat setting, immediately disconnect the power to the heater at the circuit breaker. Inspect for any objects on or adjacent to the heater that may cause high temperatures. After inspecting the heater, keep the power to the heater off for 10 minutes to reset the SLP thermal protector. If the SLP thermal protector shuts the heater off again, immediately turn the heater off at the circuit breaker and inspect the heater for possible fan motor failure or dirt and lint on the heating element. Repeat the starting procedure.

INSTALLATION INSTRUCTIONS

COMMONLY ASKED QUESTIONS

Q. Will the room heat up faster if I put the thermostat on 90 degrees when I get home?

A. No. The thermostat is just an on-off switch that is temperature sensitive. The heater is either on or off.

Q. My baseboards are on outside walls, should fan heaters be also?

A. No. A fan heater, recessed into an outside wall, will create extra heat loss and air leakage for that room. An inside wall, facing a cold window, is the best location.

Q. My thermostat is above my fan-heater. Why?

A. The fan heater blows warm air away from itself and into the room. By the time the warm air has recirculated and reached the thermostat above the heater, a comfortable room temperature has been achieved.

Q. Will my electric bill be lower if I use 120 volt heaters?

A. No. Same size 120 volt and 240 volt heaters will use the same amount of power, measured in watts or kilowatts. Your electric company charges by kilowatt hours.

Q. Should I clean my heater?

A. Yes. Once a year you must clean and inspect your heaters. You may request a copy of the operation & maintenance for your heater if you have lost it.

Q. Why does my new heater produce smoke when I turn it on?

A. In the manufacturing process a high temperature stove paint is used, which will burn when the heater is energized. The smoke will stop after the heater has fully heated. There is no cause for alarm. It is recommended to open a window during initial operations.

Q. If I need to replace my heater, can I use a higher wattage heater?

A. Your electrical system was sized for the original heater's wattage. A smaller heater would be OK, but a larger heater may create a hazard. Have the circuit checked by a licensed electrician.

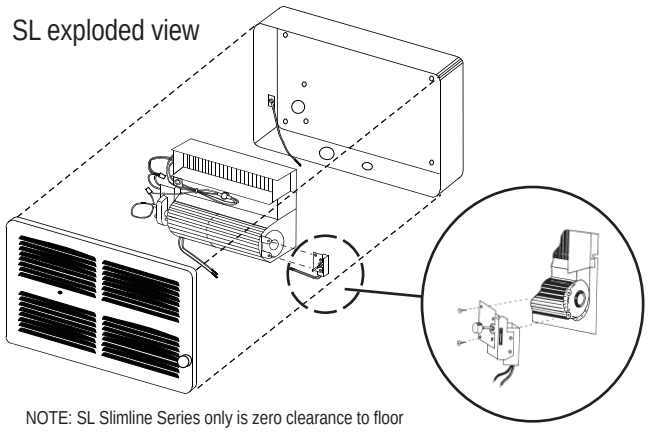
Q. Are King heaters actually made in Seattle, Washington?

A. Yes. Since 1958 we have made quality residential, commercial and industrial heating products in the same location.

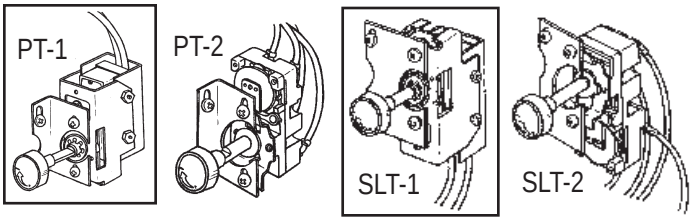
OPTIONS

MODEL	DESCRIPTION	UPC# 093319 PART #	WEIGHT
PAW - GUARD	PAW Safety Guard	16550	3.5
PAWOG-A	13" x 13" x ¾" Retrofit Grille	00555	3
PAWOG-B	8½" x 17" x ¾" Retrofit Grille	00560	3
ULTRA-W	ULTRA Grille (White)	18740	4
ULTRA-A	ULTRA Grille (Almond)	18745	4
PT-1	Single Pole Thermostat Kit	16306	.5
PT-2	Double Pole Thermostat Kit	16307	.5
SLT-1	Single Pole Single Throw Thermostat Kit	19562	.5
SLT-2	Double Pole Single Throw Thermostat Kit	19564	.5
ES230-R	Electronic Line Voltage	10374	1
ESP230-R	7 Day Independant Electronic Programmable	10380	1

Between 5-10 years you may want to upgrade your thermostat, as the sensing element may not be as accurate as when new. The most accurate thermostats are the electronic ES230 or ESP230 models. If, in the future, you decide to remodel or add rooms to your home, you won't have to worry about the size of your heating system. With electric heat you can add to the heating system, in large or small increments.

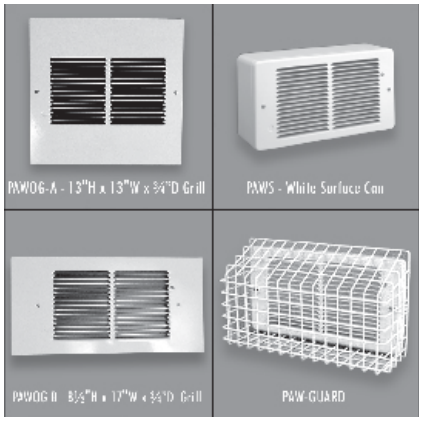


NOTE: SL Slimline Series only is zero clearance to floor



ULTRA GRILLE

Depth - 1¼"
Height - 7¼"
Width - 16"



ESP

Zone Control *(setting the thermostats)*:

Thermostat settings are a matter of personal preference. A few days of adjustments will help you determine the setting that is comfortable for you. Most people keep their living quarters at 68 to 72ºF (20 to 22ºC) and sleeping areas at 65ºF (18ºC).
It is also wise to set living area thermostats back at night, but not below 60ºF (16ºC).

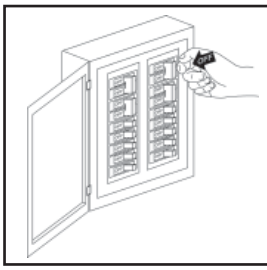
Temperature & cost relationship:

When setting your thermostat you may want to consider the relative cost of various temperatures. The chart at right shows how much higher your heating bill may be if you like temperatures warmer than 70ºF (21ºC).

80º	+31.0%
79º	+28.0%
78º	+25.0%
77º	+21.9%
76º	+18.7%
75º	+15.6%
74º	+12.5%
73º	+9.4%
72º	+6.2%
71º	+3.1%
70º	
69º	-3.1%

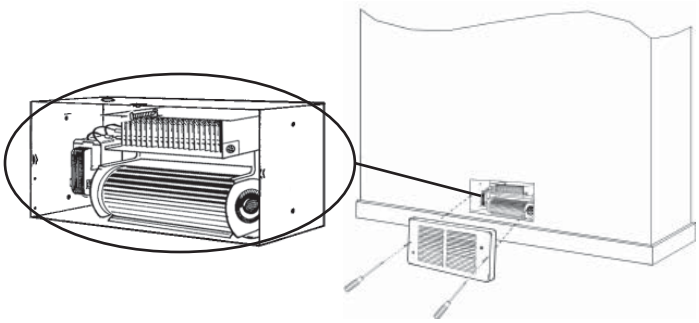
CLEANING & MAINTENANCE GUIDE FOR PAW - DEC - SL SERIES HEATERS

Regular maintenance on an electric wall heater will prolong the life of the product and keep it operating safely. Heaters should be cleaned and inspected every 6 months. This guide will show in detail how to properly clean and maintain your King electric wall heater. It will also show when parts or perhaps the entire heater should be replaced. Listed below are step by step instructions for cleaning and maintaining the PAW Series Wall Heater.



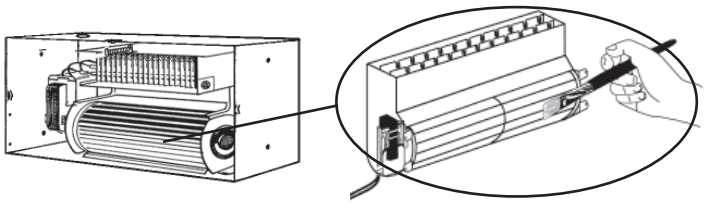
WARNING: Take extreme caution when working with electrical heaters. Turn off the electrical power to the heater before removing the grille of the heater. Lock, tape or tag the circuit breaker so that the power cannot be turned on accidentally while working on the heater.

1. After the power is turned off, remove grille using a #2 square drive or a #2 Phillips head screw driver. DO NOT remove heater interior and wall can from wall! Clean grille before reinstalling.

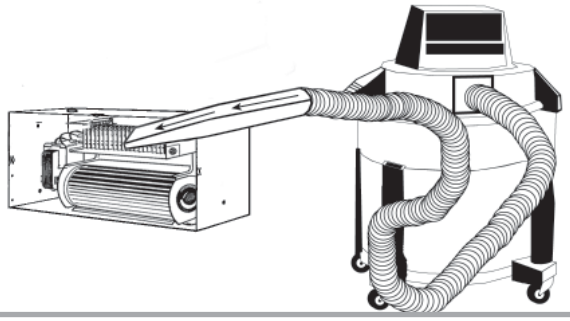


2. Use a soft bristled brush (1" to 2" wide) such as a paint brush to remove any contaminants from the fan cage. Also spin the fan by hand to make sure that it spins freely. If it feels like the motor is binding see instructions below for oiling motor.

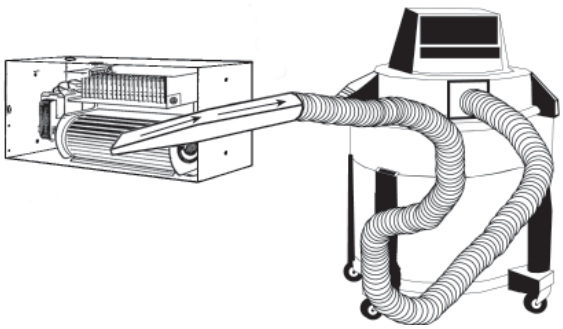
To clean heater, start by using a vacuum cleaner nozzle in the blow out mode.



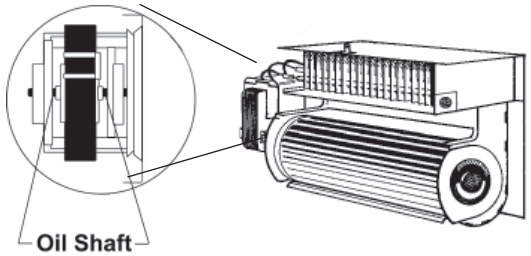
3. To clean the element, point the nozzle at the element as shown on the diagram and blow the dust out. This will dislodge any contaminates caught on the heating element. Compressed air blown onto the element works well also. If you have another vacuum, you can blow out from the bottom and suck the debris from the opening at the same time which will minimize dirt and lint being blown into the room.



4. Vacuum out any material in the squirrel cage by placing the vacuum nozzle close to the fan cage. Be careful not to bend the squirrel cage because it could become out of balance if deformed.



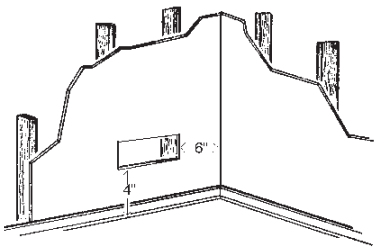
5. After removing contaminates lubricate the motor shaft and bearing with a few drops of S.A.E. 20 synthetic oil at the locations shown. *Do not use WD-40.* If the motor does not spin freely after oiling, it should be replaced. Newer models have capped bearings and cannot be oiled. Inspect the limit and look for signs of overheated wires and parts that may need to be replaced.



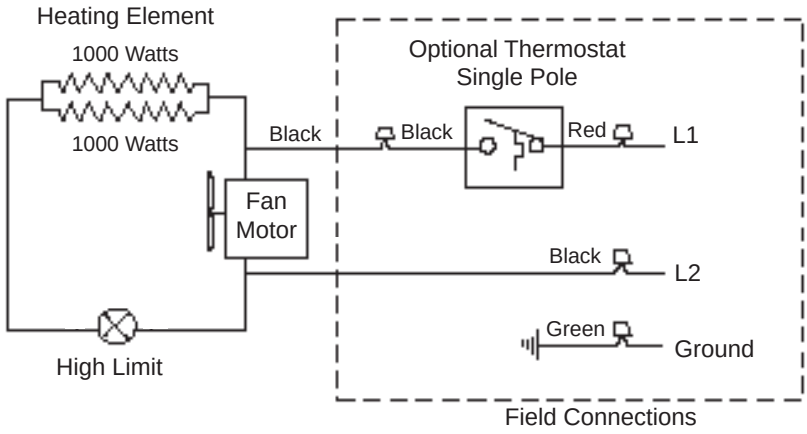
The useful life on a PAW - DEC - SL Series Heater depends on the amount of use, environment, and how often it is cleaned and maintained. Heaters operated beyond their useful life are more prone to problems. For example, when a motor slows down due to wear or lack of cleaning it reduces the CFM and can cause the heater to overheat, tripping the limit control. The limit will cycle the heater on and off. It is much safer to fix the cycling heater before it fails. Heaters produced after 1992 have a light which turns on when the limit trips. Heaters prior to that do not have the light and are therefore more difficult to detect a cycling occurrence. One way to tell is by listening for the click that is made when the limit trips. With regular inspection and maintenance, your heater will operate safely and efficiently. Heaters manufactured after 2003 use a manual limit and do not have a light.

INSTALLATION INSTRUCTIONS

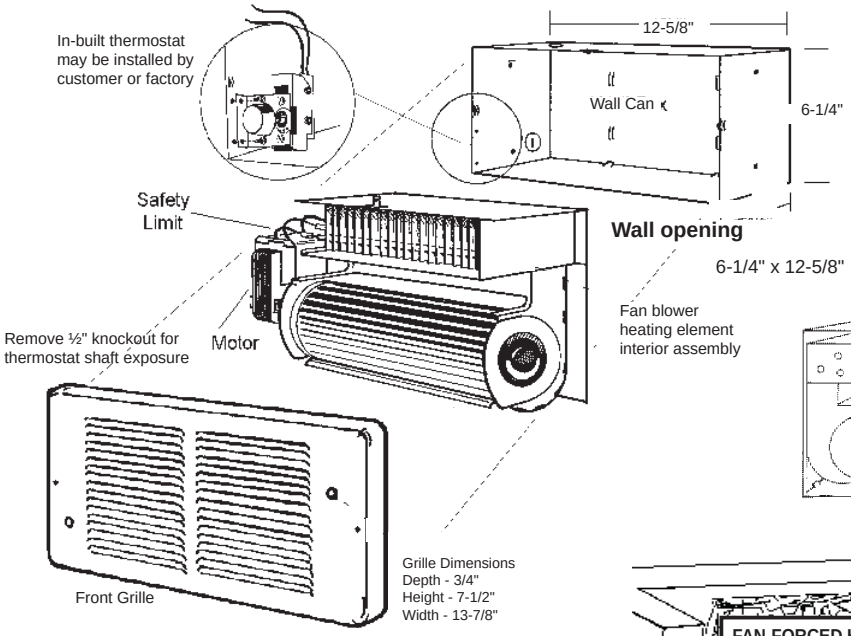
277 Volt Wiring Diagram

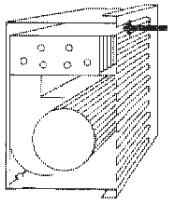


Minimum Clearances
Side Wall - 6"
Outside Wall - 16" (Recommended)
Floor - 4" (10" Recommended)
SL Series approved for zero clearance to floor

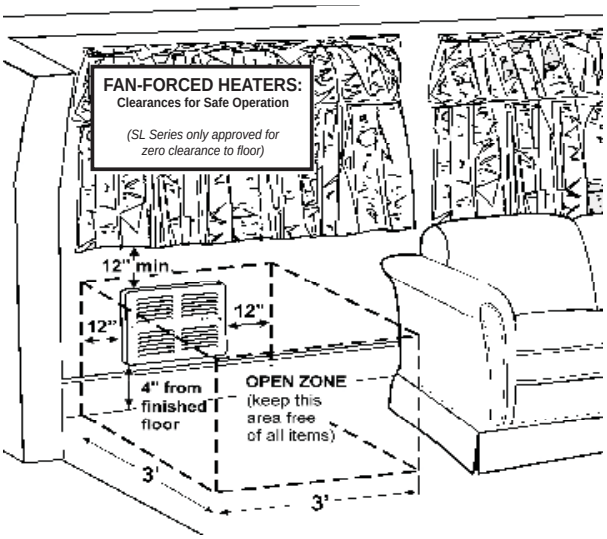


Warning: Check nameplate voltage on heater before connecting to power source.





Top first louver in the grille must be open into and between wall can and top of heater interior for proper circulation of air



NOTE: SL Slimline Series only is zero clearance to floor

***Maintenance & Warranty Information*:**

The high quality and superior design of this heater will provide years of trouble-free performance. Each year the heater should be checked and cleaned for lint and dust accumulation. We recommend using a soft bristle brush such as a paint brush to assist in removing contaminants from the heater.

Limited One Year Warranty:

King Mfg. Co. will repair or replace, without charge, any King product found to be defective or malfunctioning during the first year of purchase to the original owner. The PZ-Series wall heater carries an **Extended Five Year Warranty** on the heating element.

277V insert PAW-DEC-SL.indd : 8/09

MUH SERIES

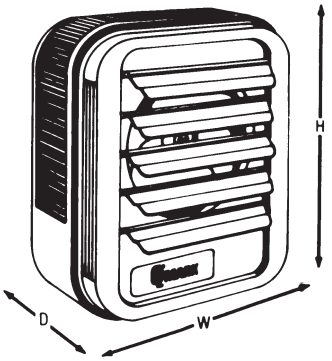
Model: **MUH-0341**
Designation: **UH-801, UH-802**

QMARK®
A Marley Engineered Products Brand

470 Beauty Spot Rd. E, Bennettsville, SC 29512
visit www.qmarkmep.com for more info

ARCHITECT'S AND ENGINEER'S SPECIFICATIONS*

- Unit mounts either horizontally or vertically. Totally versatile. For factories, warehouses, garages, stores, shipping rooms, power stations, aircraft hangers. Can be used for primary, supplementary, spot, or dual-system heating.
- Wide range of optional control kits are field installable, increasing the MUH adaptability to the specification market.
- Forced air unit heater with 10 power ratings; from 3KW to 50 KW heating output; 208, 240, 277 and 480V, 10,230 to 170,500 BTU/hr.
- 32 compatible models (no need to try to assemble a heating system from 70 or 80 models!)
- Heavy gauge die-formed steel housing. Two-toned, smartly styled.
- Advanced pull-through air flow design draws air across heating element for more even air distribution and cooler element operation.
- Specially designed venturi outlet to meet that added throw as required in vertical position.
- Branch circuit fusing (when required).
- Completely enclosed fan motor.
- 1- or 3-phase wiring on 5 through 10 KW 208/240V and 15 KW 208V units (field interchangeable).
- Aluminum-finned, copper clad steel sheath heating element has longer useful life, because of cooler sheath temperature and faster heat dissipation.
- 24V control transformer standard on most models, providing a safer and more accurate means of temperature control. 3KW and 5KW, 208-277V, have line voltage controls as standard (24V control available on made-to-order basis).
- Automatic reset linear thermal cut-out, capillary type, provides protection over entire length of element areas (Manual reset protection available on made-to-order basis).
- 2-speed fan selector switch (25 to 50 KW models).
- Fan delay feature eliminates cold drafts. Element heats up before fan cuts in, then fan continues to distribute heat after element shuts off.
- Ruggedly built, yet lighter weight for easier installation. No piping flutes, valves, or traps.
- Individually adjustable discharge louvers to control air flow.
- Choice of optional diffusers for variety of air patterns, maximizing heat concentration and coverage in the vertical position.
- Meets all UL, NEC, and OSHA requirements.



DIMENSIONS

CAT. NO.	HEIGHT	WIDTH	DEPTH
MUH-03 & 05	16"	14"	7 1/2"
MUH-07 & 10	21 3/4"	19"	7 1/2"
MUH-15 & 20	21 3/4"	19"	12 3/4"
MUH-25 & 30	30"	26 5/8"	11 3/4"
MUH-40 & 50	30"	26 5/8"	17 1/8"

SELECTION CHART

CAT. NO.	VOLTS	ELECTRICAL DATA				CONTROL VOLT (1)	2 STAGE ELEMENT CONTROL	AIR DELIVERY DATA			FAN MOTOR DATA			MAXIMUM EFFECTIVE MOUNTING HEIGHT		HORI. AIR THROW	WIRE SIZE	INSTALLED WEIGHT (LBS.) W/BRACK.
		PHASE	KW	BTU/HR. 000	AMPS (3)			CFM(2)	FPM(2)	ΔT(°F)	VOLTS	RPM(2)	HP	HORIZ.	VERT.			
MUH03-81	208	1Ø	3.0	10.2	14.5	208	N/A	350	800	27 °	208	1600	1/100	8	9	12	AWG 12	27
MUH03-21	208/240	1Ø	2.2/3.0	7.5/10.2	11.0/12.5	208/240	N/A	350	800	27 °	208/240	1600	1/100	8	9	12	AWG 12	27
MUH03-71	277	1Ø	3.0	10.2	11.0	277	N/A	350	800	27 °	277	1600	1/100	8	9	12	AWG 14	27
MUH03-31	347	1Ø	3.0	10.2	8.6	347	N/A	350	800	27 °	347	1600	1/100	8	9	12	AWG 14	27
MUH03-41	480	3Ø	3.0	10.2	3.6	24	N/A	350	800	27 °	480	1600	1/100	8	9	12	AWG 14	27
MUH03-61	600	3Ø	3.0	10.2	2.9	600	N/A	350	800	27 °	600	1600	1/100	8	9	12	AWG 14	27
MUH05-81	208	1-3Ø	5.0	17.0	24.0	208	5A	350	800	45 °	208	1600	1/100	8	9	12	AWG 10	27
MUH05-21	208/240	1-3Ø	3.7/5.0	12.6/17.0	18.0/21.0	208/240	5A	350	800	45 °	208/240	1600	1/100	8	9	12	AWG 10	27
MUH05-71	277	1Ø	5.0	17.0	18.0	277	N/A	350	800	45 °	277	1600	1/100	8	9	12	AWG 10	27
MUH05-31	347	1Ø	5.0	17.0	14.4	347	N/A	350	800	45 °	347	1600	1/100	8	9	12	AWG 10	27
MUH05-41	480	3Ø	5.0	17.0	6.0	24	N/A	350	800	45 °	480	1600	1/100	8	9	12	AWG 14	27
MUH05-61	600	3Ø	5.0	17.0	4.8	600	N/A	350	800	45 °	600	1600	1/100	8	9	12	AWG 14	27
MUH-07-8	208	1-3Ø	7.5	25.6	36.0	24	5B	650	970	37 °	208	1600	1/30	9	14	18	AWG 6	38
MUH-07-2	208/240	1-3Ø	5.6/7.5	19.1/25.6	27.0/31.3	24	5B	650	970	37 °	208/240	1600	1/30	9	14	18	AWG 8	38
MUH-07-7	277	1Ø	7.5	25.6	27.0	24	5B	650	970	37 °	277	1600	1/30	9	14	18	AWG 8	38
MUH-07-3	347	1Ø	7.5	25.6	21.6	24	5B	650	970	37 °	347	1600	1/30	9	14	18	AWG 14	38
MUH-07-4	480	3Ø	7.5	25.6	9.0	24	5B	650	970	37 °	480	1600	1/30	9	14	18	AWG 14	38
MUH-07-6	600	3Ø	7.5	25.6	7.3	24	5B	650	970	37 °	600	1600	1/30	9	14	18	AWG 14	38
MUH-10-8	208	1-3Ø	10.0	34.1	48.0	24	5B	650	970	49 °	208	1600	1/30	9	14	18	AWG 4	38
MUH-10-2	208/240	1-3Ø	7.5/10.0	25.6/34.1	36.0/42.0	24	5B	650	970	49 °	208/240	1600	1/30	9	14	18	AWG 6	38
MUH-10-7	277	1Ø	10.0	34.1	36.0	24	5B	650	970	49 °	277	1600	1/30	9	14	18	AWG 6	38
MUH-10-3	347	1Ø	10.0	34.1	28.8	24	5B	650	970	49 °	347	1600	1/30	9	14	18	AWG 14	38
MUH-10-4	480	3Ø	10.0	34.1	12.0	24	5B	650	970	49 °	480	1600	1/30	9	14	18	AWG 14	38
MUH-10-6	600	3Ø	10.0	34.1	9.7	24	5B	650	970	49 °	600	1600	1/30	9	14	18	AWG 14	38
MUH-15-8	208	1-3Ø	15.0	51.2	72.0	24	5A	910	1640	52 °	208	1530	1/20	11	20	35	AWG 2	53
MUH-15-2	208/240	3Ø	11.2/15.0	38.2/51.2	31.3/36.1	24	5C	910	1640	52 °	208/240	1530	1/20	11	20	35	AWG 6	53
MUH-15-4	480	3Ø	15.0	51.2	18.0	24	5C	910	1640	52 °	480	1530	1/20	11	20	35	AWG 10	53
MUH-15-6	600	3Ø	15.0	51.2	14.5	24	5C	910	1640	52 °	600	1530	1/20	11	20	35	AWG 12	53
MUH-20-8	208	3Ø	20.0	68.2	56.0	24	5A	1320	2060	48 °	208	1500	1/10	12	23	41	AWG 4	60
MUH-20-2	208/240	3Ø	15.0/20.0	51.2/68.2	41.2/48.0	24	5C	1320	2060	48 °	208/240	1500	1/10	12	23	41	AWG 4	60
MUH-20-4	480	3Ø	20.0	68.2	24.0	24	5C	1320	2060	48 °	480	1500	1/10	12	23	41	AWG 10	60
MUH-20-6	600	3Ø	20.0	68.2	19.3	24	5C	1320	2060	48 °	600	1500	1/10	12	23	41	AWG 12	60
MUH-25-2	208/240	3Ø	18.7/25.0	63.8/85.2	52.0/60.0	24	5A	2100/1800	2100/2030	38 °/44 °	208/240	1600/1375	1/4	13	23	50	AWG 3	93
MUH-25-4	480	3Ø	25.0	85.2	30.0	24	5C	2100/1800	2100/2030	38 °/44 °	480	1600/1375	1/4	13	23	50	AWG 8	93
MUH-25-6	600	3Ø	25.0	85.2	24.2	24	5C	2100/1800	2100/2030	38 °/44 °	600	1600/1375	1/4	13	23	50	AWG 10	93
MUH-30-8	208	3Ø	30.0	102.3	84.0	24	5A	2100/1800	2100/2030	45 °/53 °	208	1600/1375	1/4	12	20	50	AWG 1	93
MUH-30-2	208/240	3Ø	22.5/30.0	76.7/102.3	63.0/72.3	24	5A	2100/1800	2100/2030	45 °/53 °	208/240	1600/1375	1/4	12	20	50	AWG 2	93
MUH-30-4	480	3Ø	30.0	102.3	36.0	24	5C	2100/1800	2100/2030	45 °/53 °	480	1600/1375	1/4	12	20	50	AWG 6	93
MUH-30-6	600	3Ø	30.0	102.3	29.0	24	5C	2100/1800	2100/2030	45 °/53 °	600	1600/1375	1/4	12	20	50	AWG 8	93
MUH-40-2	208/240	3Ø	30.0/40.0	102.3/136.4	83.4/96.4	24	5A	3000/2600	3260/2900	42 °/49 °	208/240	1525/1420	1/2	15	28	60	AWG 1/0	114
MUH-40-4	480	3Ø	40.0	136.4	48.0	24	5A	3000/2600	3260/2900	42 °/49 °	480	1525/1420	1/2	15	28	60	AWG 4	114
MUH-40-6	600	3Ø	40.0	136.4	38.7	24	5A	3000/2600	3260/2900	42 °/49 °	600	1525/1420	1/2	15	28	60	AWG 6	114
MUH-50-8	208	3Ø	50.0	170.5	139.0	24	5A	3000/2600	3260/2900	53 °/61 °	208	1525/1420	1/2	15	25	60	AWG 4/0	114
MUH-50-2	208/240	3Ø	37.5/50.0	127.3/170.5	104.2/120.4	24	5A	3000/2600	3260/2900	53 °/61 °	208/240	1525/1420	1/2	15	25	60	AWG 3/0	114
MUH-50-4	480	3Ø	50.0	170.5	60.2	24	5A	3000/2600	3260/2900	53 °/61 °	480	1525/1420	1/2	15	25	60	AWG 4	114
MUH-50-6	600	3Ø	50.0	170.5	48.3	24	5A	3000/2600	3260/2900	53 °/61 °	600	1525/1420	1/2	15	25	60	AWG 3	114

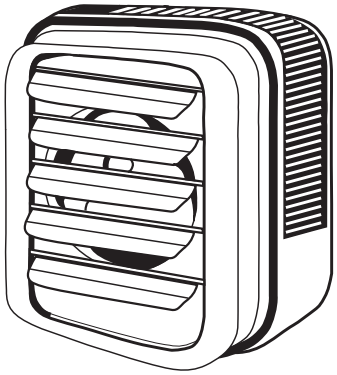
Note:

1. All standard units are supplied with a low voltage control transformer and contactor (24V) except MUH-03 & 05, 208, 240 & 277 volt models. Low voltage control on these units are available on made to order. All units are also available on special order for 120 volt control; internal and transformer or external without transformer.
2. On dual voltage units; CFM, FPM, and RPM are shown at higher voltage.
3. On dual phase units, maximum amp draw is listed for respective voltage.
4. 25 thru 50 KW models have two speed motors and dual CFM ratings.

5A. Standard.
5B. Optional - made to order - amp load unbalanced on 3 Phase.
5C. Optional - made to order - amp load balanced on 3 Phase.

QMARK®
A Marley Engineered Products Brand

MUH Series
Modular Unit Heaters



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Installation, Operation & Maintenance Instructions

Dear Owner,

Congratulations! Thank you for purchasing this new heater manufactured by Marley Engineered Products. You have made a wise investment selecting the highest quality product in the heating industry. Please carefully read the installation and maintenance instructions shown in this manual. You should enjoy years of efficient heating comfort with this product from Marley Engineered Products... the industry's leader in design, manufacturing, quality and service.

... The Employees of
Marley Engineered Products

⚠ WARNING ⚠

Read Carefully - These instructions are written to help you prevent difficulties that might arise during installation of heaters. Studying the instructions first may save you considerable time and money later. Observe the following procedures, and cut your mounting time to a minimum.

To reduce risk of fire or electric shock:

1. To prevent electrical shock, disconnect all power coming to heater at main service panel before wiring or servicing.
2. All wiring must be in accordance with the National and Local Electrical Codes and the heater must be grounded as a pre-caution against possible electric shock.
3. Verify the power supply voltage coming to heater matches the ratings printed on the heater name plate before energizing.
4. This heater is hot when in use. To avoid burns, do not let bare skin touch hot surfaces.
5. Do not insert or allow foreign objects to enter any ventilation or exhaust opening as this may cause an electric shock, fire,or damage to the heater.
6. To prevent a possible fire, do not block air intakes or exhaust in any manner. Keep combustible materials, such as crates, drapes, etc., away from heater. Do not install behind door, furniture, towels, or boxes.
7. A heater has hot and arcing or sparking parts inside. Do not use it in areas where gasoline, paint or flammable liquids are stored.
8. Use this heater only as described in this manual. Any other use not recommended by the manufacturer may cause fire, electric shock, or injury to persons.
9. This heater is not approved for use in corrosive atmospheres such as marine, green house or chemical storage areas.

SAVE THESE INSTRUCTIONS

CAUTION ⚠

THE HEATER MUST BE MOUNTED AT LEAST 7' (2134MM) ABOVE THE FLOOR TO PREVENT ACCIDENTAL CONTACT WITH THE FAN BLADE WHICH COULD CAUSE INJURY.

CAUTION ⚠

THE CEILING MOUNTING STRUCTURE AND THE ANCHORING PROVISIONS MUST BE OF SUFFICIENT STRENGTH TO SUPPORT THE COMBINED WEIGHT OF THE HEATER AND MOUNTING BRACKET. (SEE TABLE 4).

CAUTION ⚠

ALL BUILT-IN THERMOSTATS: IF THE HEATER IS USED TO PREVENT PIPING OR LIQUIDS FROM FREEZING, AND IF THE THERMOSTAT IS SET BELOW 45° F (7°C), THE FAN MUST RUN CONTINUOUSLY.

CAUTION ⚠

TO PREVENT POSSIBLE OVERHEATING OR DAMAGE DUE TO OVERHEATING, KEEP AT LEAST 5' (1524MM) CLEARANCE IN FRONT OF HEATER. REFER TO TABLE 1 FOR SIDE, TOP, AND BACK CLEARANCE REQUIREMENTS.

DO NOT MOUNT MERCURY TYPE THERMOSTAT DIRECTLY ON UNIT. VIBRATION COULD CAUSE HEATER TO MALFUNCTION.

MANUAL RESET LIMIT (FACTORY INSTALLED OPTION ONLY.) THE LIMIT SWITCH IS LOCATED INTERNALLY ON THE REAR OF THE HEATER. ON THE 3KW AND 5KW MODELS, THE ACCESS TO THE RESET BUTTON IS ON THE RIGHT SIDE (WHEN FACING REAR OF HEATER); ON ALL OTHER MODELS IT IS NEAR THE TOP REAR OF THE HEATER.

THE MANUAL RESET LIMIT IS IN SERIES WITH THE AUTOMATIC RECYCLING PROTECTOR (LIMIT). THE MANUAL RESET LIMIT WILL NOT RESET UNTIL THE HEATER HAS COOLED AND THE BUTTON IS PUSHED IN.

HEATER LOCATION INSTRUCTIONS

Arrange units so their discharge air streams:

a. are subjected to a minimum of interference from columns, machinery and partitions;

b. wipe exposed walls without blowing directly at them;

c. are directed away from room occupants in comfort heating;

d. are directed along the windward side when installed in a building exposed to a prevailing wind.

Locate thermostats approximately 5' (1524mm) above the floor on interior partition walls or post away from cold drafts, internal heat sources and away from heater discharge air streams.

Small rooms can be heated by one unit heater.

Large rooms require multi-unit installations. Number and capacity of units will be determined by volume of building and square feet of floor area to be heated. Arrange units to provide perimeter air circulation where each unit supports the air stream from another.

MOUNTING THE HEATER - GENERAL

The heater may be mounted to discharge the heated air either horizontally or vertically. When the heater is mounted for vertical discharge, it is recommended that the heater be positioned so that the access door will open away from the wall to provide greater access to the wiring and control compartment. If the heater is to be mounted with the access door facing a wall, the heater must be mounted far enough from that wall to allow full opening of the access door (a distance approximately equal to the width of the heater ... check clearance before installing). Refer to Table 1 for wall and ceiling clearances before mounting heater.

The heater may be mounted for either vertical or horizontal discharge by the use of threaded rods. (Refer to Table 2 for threaded rod sizes required.) Observe the detailed procedures in the following installation instructions.

The heater may also be suspended from the wall or ceiling by means of an optional mounting bracket (type MMB or MCMB) which permits horizontal pivoting of the heater.

After the heater is installed, the louvers may be positioned to direct the heated air in the desired direction. When the heater is installed for horizontal discharge, the louvers should direct the air either straight ahead or downward. Directing the air upward may cause the heated air to remain in the ceiling area and waste energy.

Table 1. Wall and Ceiling Clearance, inches (mm)

Unit	Discharge	Ceiling	Side Wall	Back Wall
3 & 5 kW	Horiz.	2 (50.8)	6 (152.4)	9 (228.6)
	Vert.	6 (152.4)	18 (457.2)	18 (457.2)
7.5 to 10 kW	Horiz.	6 (152.4)	6 (152.4)	13 (330.2)
	Vert.	6 (152.4)	24 (609.6)	24 (609.6)
15 to 10 kW	Horiz.	6 (152.4)	9 (228.6)	12 1/2 (317.5)
	Vert	6 (152.4)	24 (609.6)	24 (609.6)
25 to 50 kW	Horiz.	16 (406.4)	12 (304.8)	18 1/2 (470.0)
	Vert.	12 (304.8)	39 (914.4)	39 (914.4)

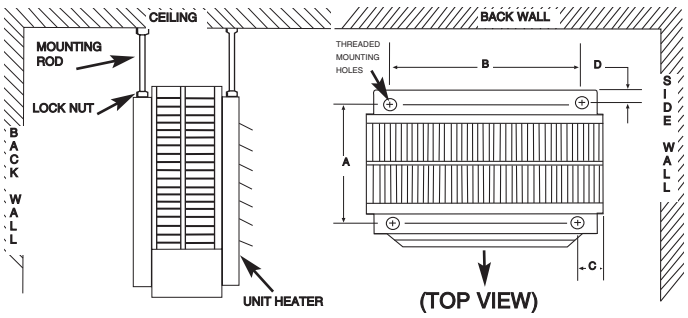


Figure 1. Horizontal Discharge Mounting and Spacing.

Table 2. Rod Thread and Spacing Dimensions, inches (mm) for Horizontal Discharge

Unit	Rod Thread Type	A	B	C	D
3 - 5 kW	5/16 - 18	6 1/16 (153.9)	6 (152.4)	4 1/16 (103.1)	3/4 (19.0)
7.5 - 10 kW			8 7/8 (225.6)	5 1/8 (130.3)	3/4 (19.0)
15 - 20 kW		11 3/8 (289.0)			
25 - 30 kW	3/8 - 16	10 9/16 (268.2)	14 - 12 (368.3)	6 3/16 (157.2)	5/8 (16.0)
40 - 50 kW		15 15/16 (404.9)	14 - 12 (368.3)	6 3/16 (157.2)	5/8 (16.0)

Horizontal Discharge (Rod-mount from Ceiling)

1. Install four threaded mounting rods in the threaded holes and secure in place using lock nuts. (See Table 2).
2. Securely attach the four mounting rods to the ceiling. (Refer to Table 1 for wall and ceiling clearances, and Table 2 for mounting rod spacing).

Table 3. Rod Thread and Spacing Dimensions, inches (mm) for Vertical Discharge

Unit	Rod Thread Type	E	F	G	H
3 - 5 kW	5/16 - 18	6 (152.4)	9 3/4 247.7)	2 (50.8)	4 1/16 (103.1)
7.5 - 20 kW		8 7/8 (225.6)	14 5/8 (371.6)	2 (50.8)	5 1/8 (130.3)
25 - 30 kW	3/8 - 16	14 1/2 (368.3)	21 1/4 (539.8)	2 3/16 (56.0)	6 3/16 (157.2)

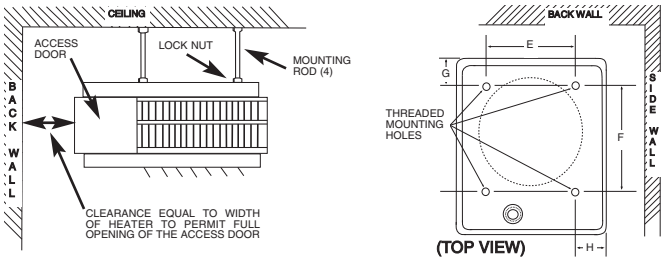


Figure 2. Vertical Discharge Mounting and Rod Spacing

Vertical Discharge (Rod-Mount from Ceiling)

1. Remove bolts from the threaded holes in the back of the heater.
2. Install four threaded mounting rods in the threaded holes and and secure in place using lock nuts.
3. Securely attach the four mounting rods to the ceiling. (Refer to Table 1 for wall and ceiling clearances, and Table 3 for mounting rod spacing dimensions.)

WIRING

Branch Circuit (Power)

1. Connect heater only to the voltage, amperage and frequency specified on the nameplate.
2. Field wiring must be properly sized to carry the amperage in accordance with the NEC.
3. The access door is hinged. There are either one or two screws accessible from the side that must be loosened to gain access. These screws are the captive type; do not try to remove them.
4. A knockout is provided in the back of the heater close to the power terminal block and the control terminal board. The control terminal board knockout is 1/2 inch (12.7 mm) conduit size. The power terminal block knockout is multiple diameter. Use the diameter that fits the required conduit size.
5. A ground terminal is provided near the power terminal board. The ground wire should be connected before other connections are made.
6. The power terminal block is equipped with box terminals sized to accept the correct size power supply wire. Branch circuit wire rated min 600V, 60° C is acceptable for heaters rated up to 80 amps. For heaters rated more than 80 amps, branch circuit wire must be rated at least 75°C. Either aluminum or copper wire is satisfactory for connection to the heater power terminal block box terminal. Copper wire is recommended and must be used with built-in disconnect switch.
7. Each heater has a wiring diagram affixed to the inside of the access door. Consult this diagram before making any field connections.

Important Note - Installation Screw Lug Torque:
During transportation it is possible screw lug connections can loosen. After installation, before power is turned on to the heater, check all screw lug connections for tightness to a recommended minimum torque of 35 in-lbs. (3.9 N-m).

8. Single or three-phase power connections may be used with heater models MUH0521, MUH0581, MUH072, MUH078, MUH102, MUH108, and MUH158. These units are factory wired for single-phase operation. If these heaters are for use with three-phased power, reconnect the wires as indicated in the wiring diagram attached to the heater. Additional information can be found by looking at the wiring illustrations in Figures 3a and 3b and following the directions shown below.

On models MUH0521,MUH0581, MUH072, MUH078, MUH102, and MUH108 (Figure 3a), move only the two wires marked “A1” and marked “B1”; do not move or change any other wiring. The element lead wire marked “B1” which is factory connected to the power terminal block (terminal located closest to the elements) must be moved to terminal “B” on the three-phase terminal block.

The relay (contactor) lead wire “A1” must be moved from the end terminal of the power terminal block (terminal closest to the contactor or control terminal board) to the “A” terminal of the lower terminal block (center terminal).

Model MUH158 (Figure 3b) has two three-phase terminal blocks located adjacent to the relays (contactors). Move only the two wires marked “C1” and “D1” on each of these two three-phase terminal blocks to terminal “B”. Do not move or change any other wires.

9. Electrical Accessories, either kits or factory-installed options, are shown connected by a dash line on the heater wiring diagram.
10. **208/240 VOLT HEATER:** The heaters are wired for 240V from factory. When heater is to be connected to 208V supply, the transformer leads have to be interchanged. For units rated 30/40kW or higher, interchange ORANGE and RED primary leads. The black colored lead is the COMMON for the transformer (50VA) provided with the high wattage units. For lower kW rated heaters, interchange BLACK and RED primary leads. The WHITE colored lead is the COMMON for the control transformer provided with these heaters. Always refer to the wiring diagram on the cover of the heater before making this reconnection of tranformer primary leads.

Control Wiring

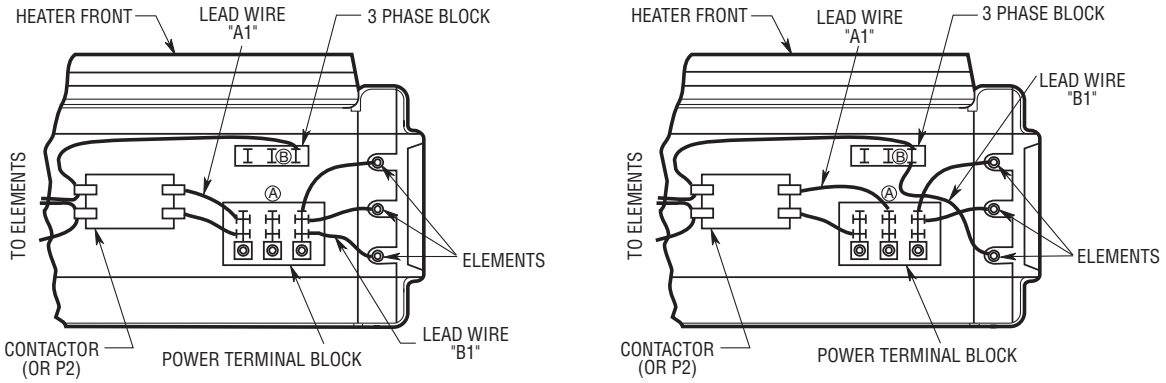
⚠ WARNING ⚠

LINE VOLTAGE IS PRESENT ON SOME OF THE TERMINALS ON THE CONTROL TERMINAL BOARD. ALWAYS DISCONNECT THE POWER FROM THE HEATER BEFORE MAKING ANY CONNECTIONS TO THE CONTROL BOARD TO PREVENT ELECTRIC SHOCK HAZARD.

1. Use min. 600 volts, NEC Class 1 insulated wire for all control circuit wiring.
2. Use a crimp-on type fork terminal on the wire ends that attach to the control terminal board if more than one connection is to be made under the terminal screw.
3. On units not provided with internal contactor (3 & 5 KW), refer to Figure 4 for wiring diagram.

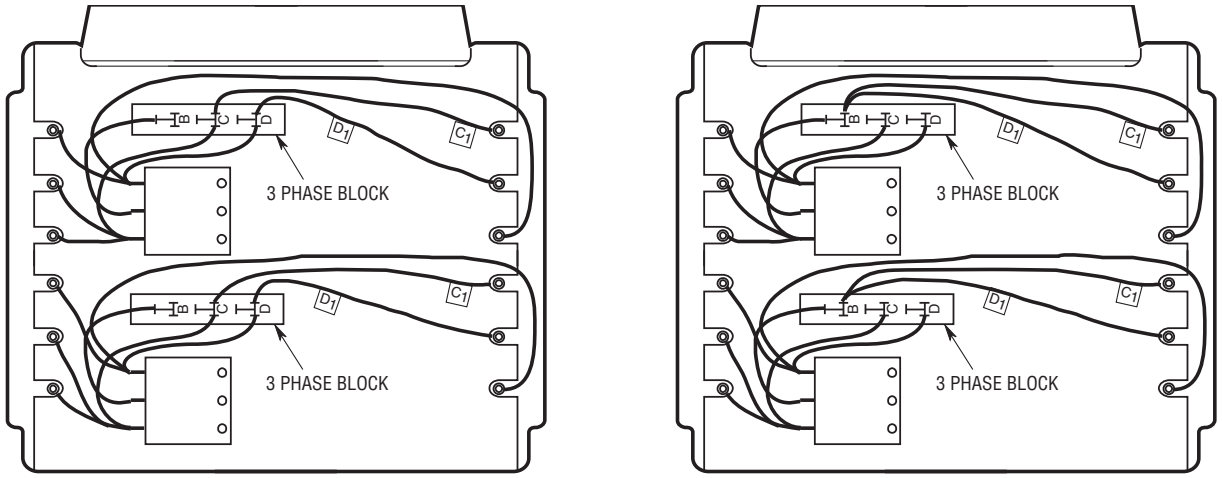
Note: Thermostat and control circuit wiring must be suitable to handle the full load of the heater (example MUH0581 is rated 24 amps)

4. On units provided with internal contactor (units rated 7 KW and higher) refer to Figure 5 for wiring diagram. Control wiring must be rated minimum 18 AWG.



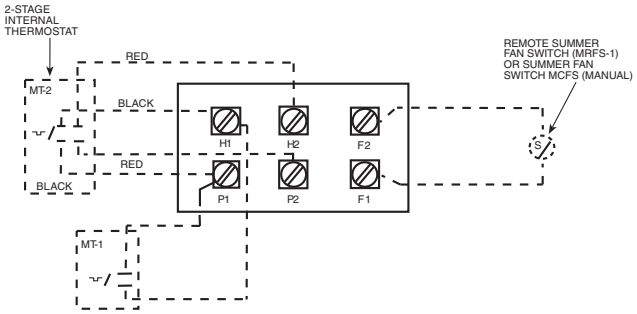
FACTORY-WIRED FOR SINGLE-PHASE POWER **FIELD-WIRED FOR THREE-PHASE POWER**

Figure 3a. Wiring Connections for Single-Phase and Three -Phase Power(MUH0521, MUH0581, MUH072, MUH078, MUH102 and MUH108)



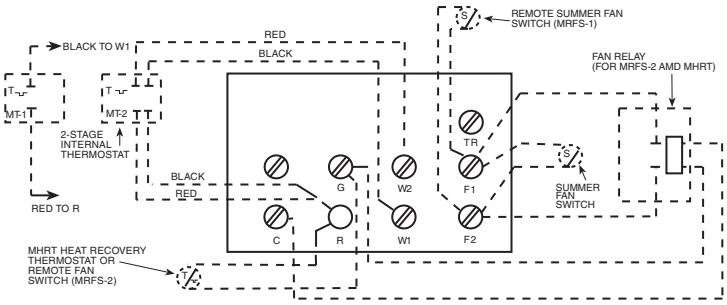
FACTORY-WIRED FOR SINGLE-PHASE POWER **FIELD-WIRED FOR THREE-PHASE POWER**

Figure 3b. Wiring Connections for Single-Phase and Three -Phase Power (MUH158)



NOTES:
1. THIS STYLE CONTROL TERMINAL BOARD USED WITH MODELS MUH0321, MUH0371, MUH0381, MUH0521, MUH0571, AND MUH0581.
2. WHEN UNIT IS WIRED FOR SINGLE-PHASE, JUMPER H1 TO H2. IF SINGLE-POLE THERMOSTAT IS USED WITH SINGLE-PHASE UNIT, CONNECT THERMOSTAT LEADS TO P1 AND H1.
3. EXTERNAL LINE VOLTAGE THERMOSTATS SHOULD BE TREATED AS SINGLE STAGE ONLY.

Figure 4. Control Terminal Board (for Heaters Without Contactors)



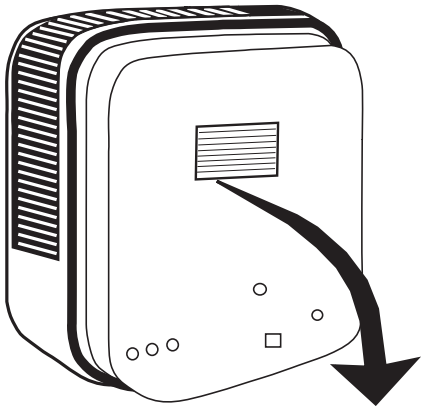
NOTES:

1. THIS STYLE CONTROL TERMINAL BOARD USED WITH MODELS EXCEPT MUH0321, MUH0371, MUH0381, MUH0521, MUH0571, AND MUH0581.
2. REMOVE JUMPER W1 TO W2 WHEN 2-STAGE THERMOSTAT IS USED.
3. *ONLY ONE OF THESE ACCESSORIES MAY BE INSTALLED IN A SINGLE HEATER.
4. EXTERNAL LINE VOLTAGE THERMOSTATS SHOULD BE TREATED AS SINGLE STAGE ONLY.

Figure 5. Control Terminal Board (for Heaters With Contactors)

Table 4. Specifications

Basic Model No.	Height in (mm)	Width in. (mm)	Depth in. (mm)	Mounting Weight lbs. (kg)	Wiring Compartment Volume
MUH0381	16 (406.4)	14 (355.6)	7 1/2 (190.5)	27 (12.2)	90 in^3 (14.70 cm^3)
MUH0321				27 (12.2)	
MUH0371				27 (12.2)	
MUH0341				30 (13.6)	
MUH0581				27 (12.2)	
MUH0521				27 (12.2)	
MUH0571				27 (12.2)	
MUH0541				30 (13.6)	
MUH0331				30 (13.6)	
MUH0361				30 (13.6)	
MUH0531				30 (13.6)	
MUH0561				30 (13.6)	
MUH078	21 3/4 (552.5)	19 (482.6)	7 1/2 (190.5)	38 (17.2)	100 in^3 (1639 cm^3)
MUH072				38 (17.2)	
MUH077				38 (17.2)	
MUH074				38 (17.2)	
MUH108				38 (17.2)	
MUH102				38 (17.2)	
MUH107				38 (17.2)	
MUH104				38 (17.2)	
MUH073				38 (17.2)	
MUH076				38 (17.2)	
MUH103				38 (17.2)	
MUH106				38 (17.2)	
MUH158	21 3/4 (552.5)	19 (482.6)	12 3/4 (323.9)	54 (24.5)	140 in^3 (2295 cm^3)
MUH152				50 (22.7)	
MUH154				50 (22.7)	
MUH208				60 (27.2)	
MUH202				55 (24.9)	
MUH204				55 (24.9)	
MUH156				55 (24.9)	
MUH206				55 (24.9)	
MUH252	30 (76.2)	26 5/8 676.4)	11 3/4 (298.5)	89 (40.4)	504 in^3 (8260 cm^3)
MUH254				89 (40.4)	
MUH308				89 (40.4)	
MUH302				89 (40.4)	
MUH304				89 (40.4)	
MUH256				89 (40.4)	
MUH306				89 (40.4)	
MUH402	30 (76.2)	26 5/8 676.4)	17 1/4 (435.1)	119 (54.0)	648 in^3 (10620 cm^3)
MUH404				119 (54.0)	
MUH508				119 (54.0)	
MUH502				119 (54.0)	
MUH504				119 (54.0)	
MUH406				119 (54.0)	
MUH506				119 (54.0)	



NAMEPLATE

MODEL NO. MUH0321
MFG. NO.

DATE CODE **0395**

VOLTS AC 60 HZ	KILOWATTS	PHASE	MIN. SUPPLY CIR. AMPACITY
208 / 240	2.2 /3	1	

MAX. FUSE	MOTOR		CONTROLS	CUSTOMER NO
	VAC	AMP	VAC	
	208/240	.25	208/240	

AIR FLOW	MINIMUM MOUNTING CLEARANCE SIDE	BACK	CEILING	FLOOR
HORIZ.	6"	9.5"	2"	7'
VERT.	18"	18"	6"	7'

WARNING: DO NOT TURN LOUVERS ABOVE LEVEL OF THE UNIT. DISCONNECT POWER BEFORE SERVICING. IF EXTERNAL CONTROL IS USED, ALSO DISCONNECT EXTERNAL POWER SUPPLY.

NE PAS RELEVER LES LAMES AU-DEL`A DU NIVEAU PREVU DE L'APPAREIL. METTRE HORS TENSION AVANT DE PROCEDER A L'ENTRETIEN. SI UNE COMMANDE EXTERNE EST UTILISEE, COUPER AUSSE L'ALIMENTATION EXTERNE. ASSURER UN DEGAGEMENT D'AU MOINS 6 PI ENTRE L'APPAREIL DE CHAUFFAGE ET LEPLANCHER.

774G LISTED
AIR HEATER

MARLEY ENGINEERED PRODUCTS
BENNETTSVILLE, SC 29512

4104-0275-036

IMPORTANT INFORMATION

LIMITED WARRANTY

All products manufactured by Marley Engineered Products are warranted against defects in workmanship and materials for one year from date of installation, except heating elements which are warranted against defects in workmanship and materials for five years from date of installation. This warranty does not apply to damage from accident, misuse, or alteration; nor where the connected voltage is more than 5% above the nameplate voltage; nor to equipment improperly installed or wired or maintained in violation of the product's installation instructions. All claims for warranty work must be accompanied by proof of the date of installation.

The customer shall be responsible for all costs incurred in the removal or reinstallation of products, including labor costs, and shipping costs incurred to return products to Marley Engineered Products Service Center. Within the limitations of this warranty, inoperative units should be returned to the nearest Marley authorized service center or the Marley Engineered Products Service Center, and we will repair or replace, at our option, at no charge to you with return freight paid by Marley. It is agreed that such repair or replacement is the exclusive remedy available from Marley Engineered Products.

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Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above exclusion or limitation may not apply to you. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

For the address of your nearest authorized service center, contact Marley Engineered Products in Bennettsville, SC, at 1-800-642-4328. Merchandise returned to the factory must be accompanied by a return authorization and service identification tag, both available from Marley Engineered Products. When requesting return authorization, include all catalog numbers shown on the products.

HOW TO OBTAIN WARRANTY SERVICE AND WARRANTY PARTS PLUS GENERAL INFORMATION

1. Warranty Service or Parts **1-800-642-4328**
2. Purchase Replacement Parts **1-800-654-3545**
3. General Product Information **www.marleymep.com**

Note: When obtaining service always have the following:
1. Model number of the product
2. Date of manufacture
3. Part number or description

Marley Engineered Products
470 Beauty Spot Rd. East
Bennettsville, SC 29512 USA

Part No. 5200-0722-013
ECR 38995
03/11